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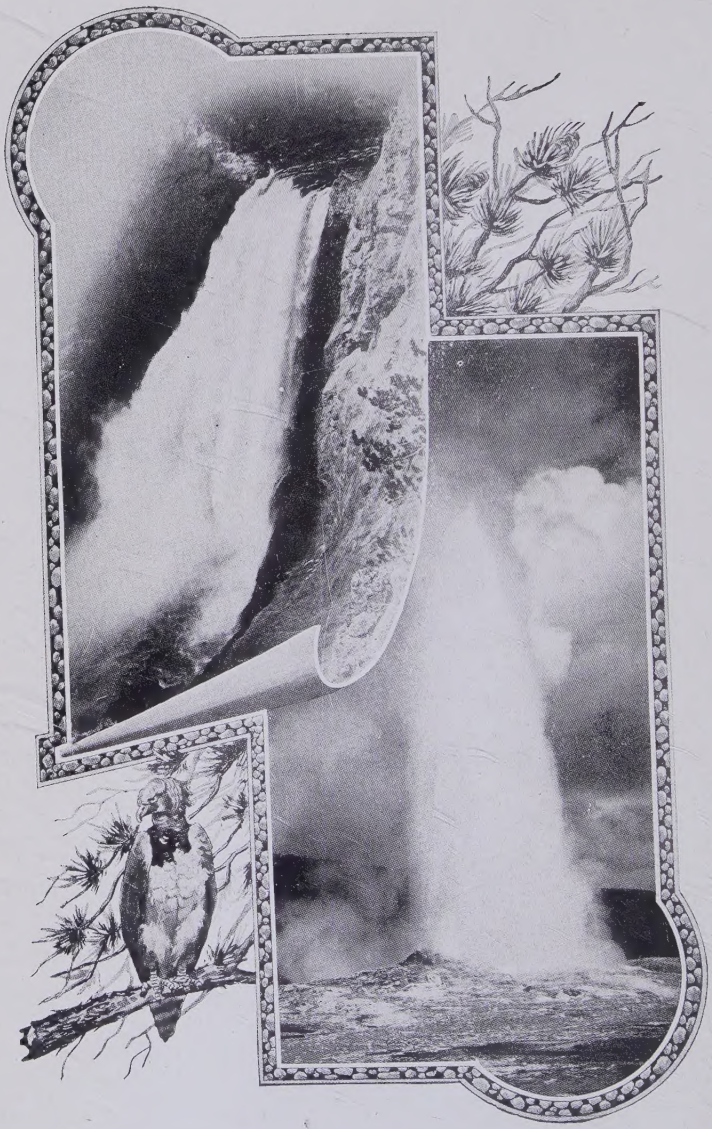

THE YELLOWSTONE NATIONAL PARK

HISTORICAL AND DESCRIPTIVE

Illustrated with Maps, Views and Portraits

By

HIRAM MARTIN CHITTENDEN
Brigadier-General United States Army. (Ret.)
Author of "American Fur Trade of the Far West," "History of Steamboat Navigation on the Missouri River," etc.

EIGHTH EDITION
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FIRST	EDITION,	1895.
SECOND	"	1896.
THIRD	"	1899.
FOURTH	"	1903.
FIFTH	"	1905.
SIXTH	"	1909.
SEVENTH	"	1912.

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PREFACE.

The present edition of *The Yellowstone* embraces a thorough revision of the entire work. Part I. (historical) contains much new matter on the early history of the Park; additional information concerning its geographical names, and a new account of the Nez Percé campaign of 1877. Part II (descriptive) is greatly enlarged in the chapters on topography, geology, thermal springs, fauna and flora, roadways and administration; while the "Tour of the Park" has been entirely recast to conform to the completed road system which has opened up new sections of the Park. The illustrations are nearly all original. Especial pains has been taken to make them representative of the Park scenery as a whole, and not simply an album of conventional geyser and waterfall views.

It is extremely gratifying to note, as time goes on, that, in every important respect, the Yellowstone Park has so far fulfilled the expectations of its founders and justified the wisdom of its creation. As a land of wonders it still remains without an equal on the globe; as a source of great rivers, whose waters will be the life-blood of a mighty future empire, its vast importance is beginning to be realized; as a refuge for the native fauna of the coun-

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try, elsewhere fast passing away, it is all that can be reasonably expected. Its growing favor with the general public is evidenced by the increasing number of visitors; and with the local public, by the reduced frequency of poaching and by the abandonment of efforts to introduce railroads or cut off portions of its territory. There is no longer any reason to doubt that the Park will maintain its integrity as one of the very few government reservations where the original conditions of nature are being preserved with fidelity.

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THE YELLOWSTONE NATIONAL PARK.

PART I.—HISTORICAL.

CHAPTER I.

"YELLOWSTONE."

Lewis and Clark passed the first winter of their famous trans-continental expedition among the Mandan Indians, on the Missouri River, fifty-six miles above the present capital of North Dakota. When about to resume their journey in the spring of 1805, they sent back to President Jefferson a report of progress and a map of the western country based upon information derived from the Indians. In this report and upon this map appear, probably for the first time in any official document, the words "Yellow Stone" as the name of the principal tributary of the Missouri.

It seems, however, that Lewis and Clark were not the first actually to use the name. David Thompson, the celebrated explorer and geographer, prominently identified with the British fur trade in the Northwest, was among the Mandan Indians on the Missouri River from December 29, 1797, to January 10, 1798. While there he secured data, principally from the natives, from which he estimated the latitude and longitude of the source of the Yellowstone River. In his

original manuscript journal and field note-books, containing the record of his determinations, the words "Yellow Stone" appear precisely as used by Lewis and Clark in 1805. This is, perhaps, the first use of the name in its Anglicised form, and it is certainly the first attempt to determine accurately the geographical location of the source of the stream.*

Neither Thompson nor Lewis and Clark were originators of the name. They gave us only the English translation of a name already long in use. "This river," say Lewis and Clark, in their journal for the day of their arrival at the mouth of the now noted stream, "had been known to the French as the Roche Jaune, or, as we have called it, the Yellow Stone." The French name was, in fact, already firmly established among the traders and trappers of the Northwest Fur Company, when Lewis and Clark met them among the Mandans. Even by the members of the expedition it seems to have been more generally used than the new English form; and the spellings, "Rejone," "Rejhone," "Rochejone," "Rochejohn," and "Rochejhone," are among their various attempts to render orthographically the French pronunciation.

Probably the name would have been adopted unchanged, as so many other French names in our geography have been, except for the recent cession of Louisiana to the

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*Thompson's estimate:
Latitude, 43° 39′ 45″ north.
Longitude, 109° 43′ 17″ west.
Yount Peak, source of the Yellowstone (Hayden):
Latitude, 43° 57′ north.
Longitude, 109° 52′ west.
Thompson's error:
In latitude, 17′ 15″.
In longitude, 8′ 43″, or about 21 miles.

United States. The policy which led the government promptly to explore, and take formal possession of, its extensive acquisition, led it also, as part of the process of rapid Americanization, to give English names to all of the more prominent geographical features. In the case of the name here under consideration this was not an easy matter. The French form had already obtained wide currency. and it was reluctantly set aside for its less familiar translation. As late as 1817, it still appeared in newly English printed books,* while among the traders and trappers of the mountains, it survived to a much later period.

By whom the name *Roche Jaune,* or its equivalent form, *Pierre Jaune,* was first used, it would be extremely interesting to know; but it is impossible to determine at this late day. Like their successor, "Yellow Stone," these names were not originals, but only translations. The Indian tribes along the Yellowstone and upper Missouri rivers had names for the tributary stream signifying "yellow rock,"† and the French had doubtless adopted them long before any of their number saw the stream itself.

It has been supposed that the Valley of the Yellowstone was visited by white men before the time of Lewis and Clark, particularly by the Chevalier de la Verendyre about the year 1743. But later researches have shown that the route of this explorer lay further South, and that he did not enter the Yellowstone Valley at all. He may have learned of the existence of that stream, and may have heard its native name; but if so there is no record of the fact.

Following de la Verendyre at the distance of nearly half a century came the traders and trappers of the Northwest

*Bradbury's "Travels in the Interior of America."

†The name "Elk River" was also used among the Crow Indians.

Fur Company. As already told, they were among the Mandans as early as 1797, and the name *Roche Jaune* was in common use among them in 1804. But it is quite certain that, prior to 1805, none of them had reached the Yellowstone River itself. Lewis and Clark particularly record the fact, while yet some distance below the junction of this river with the Missouri, that they had already passed the utmost limit of previous adventure by white men. Whatever, therefore, was at this time known of the Yellowstone could have come to these traders only from Indian sources.*

It thus appears that the name, which has now become so celebrated, descends to us, through two translations, from those native races whose immemorial dwelling place had been along the stream which it describes. What it was that led them to use the name is easily discoverable. Seventy-five miles below the ultimate source of the river lies the Grand Cañon of the Yellowstone, distinguished among the notable cañons of the globe by the marvelous coloring of its walls. Conspicuous among its innumerable tints is yellow. Every shade, from the brilliant plumage of the yellow bird to the rich saffron of the orange, greets the eye in bewildering profusion. There is indeed other color, unparalleled in variety and abundance, but the ever-present background of all is the beautiful fifth color of the spectrum.

So prominent is this feature that it never fails to attract

*Much information has come to light in recent years to throw doubt on the correctness of Lewis and Clark's statement that they were the first white men on the Upper Missouri. While no positive and definite record has yet been found disproving their statement, researches among old documents pertaining to French occupancy of Louisiana indicate that there were much earlier explorations of the Far West country than has generally been supposed.

attention, and all descriptions of the Cañon abound in references to it. Lieutenant Doane (1870) notes the "brilliant yellow color" of the rocks. Captain Barlow and Doctor Hayden (1871) refer, in almost the same words, to "the yellow, nearly vertical walls." Raymond (1871) speaks of the "bright yellow of the sulphury clay." Captain Jones (1873) says that "about and in the Grand Cañon the rocks are nearly all tinged a brilliant yellow." These early impressions might be repeated from the writings of every subsequent visitor who has described the scenery of the Yellowstone.

That a characteristic which so deeply moves the modern beholder should have made a profound impression on the mind of the Indian need hardly be premised. This region was by no means unknown to him; and from the remote, although uncertain, period of his first acquaintance with it, the name of the river has undoubtedly descended.

Going back, then, to this obscure fountain-head, the original designation is found to have been

*Mi tsi a da zi,** Rock Yellow River.

And this, in the French tongue, became

Roche Jaune and *Pierre Jaune;*

and in English,

Yellow Rock and *Yellow Stone.*

Established usage now writes it

Yellowstone.

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*Minnetaree, one of the Siouan family of languages.

CHAPTER II.

INDIAN OCCUPANCY OF THE UPPER YELLOWSTONE.

It is a singular fact in the history of the Yellowstone National Park that very little knowledge of that country seems to have been derived from the Indians. The explanation ordinarily advanced is that the Indians had a superstitious fear of the geyser regions, and therefore avoided them. How far this theory is supported by the results of modern research is an interesting inquiry.

Three great families of Indians, the Siouan, the Algonquian, and the Shoshonean, originally occupied the country around the sources of the Yellowstone. Of these three families the following tribes are alone of interest in this connection: The Crows, of the Siouan family; the Blackfeet, of the Algonquian family; and the Bannocks, the Eastern Shoshones, and the Sheepeaters, of the Shoshonean family.

The home of the Crows was in the Valley of the Yellowstone and Big Horn Rivers, below the mountains, where they have dwelt since the white man's earliest knowledge of them. Their territory extended to the mountains which bound the Yellowstone Park on the north and east; but they never occupied or claimed any of the country beyond. Their well-known tribal characteristics were an insatiable love of horse stealing and a wandering and predatory habit which caused them to roam over all the West from the Black Hills to the Bitter Root Mountains, and from the British Possessions to the Spanish Provinces. They were generally friendly to the whites, but enemies of the

neighboring Blackfeet and Shoshones. Physically, they were a stalwart, handsome race, fine horsmen and daring hunters. They were everywhere encountered by the trapper and prospector, who generally feared them more on account of their thievish habits than for reasons of personal safety.

The Blackfeet dwelt in the country drained by the headwaters of the Missouri. Their territory may be roughly defined as the watershed of that stream above and including Milk River. The distinguishing historic trait of these Indians was their settled hostility to their neighbors, whether white or Indian. They were a tribe of perpetual fighters, justly characterized as the Ishmaelites of their race. From the day in 1806, when Captain Lewis slew one of their number, down to their final subjection by the advancing power of the whites, they never buried the hatchet. They were the terror of the trapper and miner, and hundreds of the pioneers perished at their hands. Like the Crows, they were a well-developed race, good horsemen and great rovers, but, in fight, given to subterfuge and strategem rather than to open boldness of action.*

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* The term Blackfeet in the earlier years of the past century embraced, in popular language, four tribes—the Blackfeet proper, the Bloods, the Piegan and the Grosventres of the Prairies. The Grosventres did not properly belong to the Blackfeet at all, but were related to the Arapahoes, who dwelt near the headwaters of the Arkansas. In some of their early migrations the two tribes had become separated, the Grosventres settling down in the country of the Blackfeet, with whom, in the course of long association, they became closely identified. They were the most relentlessly hostile to the whites of any of the four tribes. It was a Grosventre Indian that Captain Lewis killed in 1806.

In marked contrast with these warlike and wandering tribes were those of the great Shoshonean family, who occupied the country around the southern, eastern, and western borders of the Park, including also that of the Park itself. The Shoshones as a family were an inferior race. They seem to have been the victims of some great misfortune which had driven them to precarious methods of subsistence and had made them the prey of their powerful and merciless neighbors. The names "Fish-eaters," "Root-diggers," and other opprobrious epithets, indicate the contempt in which they were commonly held. For the most part they had no horses, and obtained a livelihood only by the most abject means. Some of the tribes, however, rose above this degraded condition, owned horses; hunted buffalo, and met their enemies in open conflict. Such were the Bannocks and the Eastern Shoshones—tribes closely connected with the history of the Park, one occupying the country to the southwest near the Teton Mountains, and the other that to the southeast in the Valley of Wind River. The Shoshones were generally friendly to the whites, and for this reason they figure less prominently in the books of early adventure than do the Blackfeet, whose acts of "sanguinary violence" were a staple article for the Indian romancer.

It was an humble branch of the Shoshonean family which alone is known to have permanently occupied what is now the Yellowstone Park. They were called *Tukuarika,* or, more commonly, Sheepeaters. They were found in the Park country at the time of its discovery, and had doubtless long been there. These hermits of the mountains, whom the French trappers called *"les dignes de pitié,"* have engaged the sympathy or contempt of explorers since our earliest knowledge of them. Utterly unfit for

warlike contention, they seem to have sought immunity from their dangerous neighbors by dwelling among the inaccessible fastnesses of the mountains. They were destitute of even savage comforts. Their food, as their name indicates, was principally the flesh of the mountain sheep. Their clothing was composed of skins. They had no horses, and were armed only with bows and arrows. They captured game by driving it into brush enclosures. Their rigorous existence left its mark on their physical nature. They were feeble in mind, diminutive in stature, and are always described as a "timid, harmless race." They may have been longer resident in this region than is commonly supposed, for there was a tradition among them, apparently connected with some remote period of geological disturbance, that most of their race were once destroyed by a terrible convulsion of nature.

Such were the Indian tribes who formerly dwelt within or near the country now embraced in the Yellowstone National Park. That the Sheepeaters actually occupied this country, and that wandering bands from other tribes occasionally visited it, there is abundant and conclusive proof. Indian trails, though generally indistinct, were everywhere found by the early explorers, generally on lines since occupied by the tourist routes. One of these followed the Yellowstone Valley entirely across the Park from north to south. It divided at Yellowstone Lake, the principal branch following the east shore, crossing Two-Ocean-Pass, and intersecting a great trail which connected the Snake and Wind River Valleys. The other branch passed along the west shore of the lake and over the divide to the valley of the Snake River and Jackson Lake. This trail was intersected by an important one in the vicinity of Conant Creek leading up from the Upper Snake Valley to

that of Henry Fork. Other intersecting trails connected the Yellowstone River trail with the Madison and Firehole Basins on the west and with the Bighorn Valley on the east.

The most important Indian trail in the Park, however, was that known as the Great Bannock Trail. It extended from Henry Lake across the Gallatin Range to Mammoth Hot Springs, where it was joined by another coming up the valley of the Gardiner. Thence it led across the Blacktail Deer plateau to the ford above Tower Falls; and thence up the Lamar Valley, forking at Soda Butte, and reaching the Bighorn Valley by way of Clark's Fork and the Shoshone River.* This trail was certainly a very ancient and much-traveled one. It had become a deep furrow in the grassy slopes, and it is still distinctly visible in places, though unused for a quarter of a century.

Additional evidence in the same direction may be seen in the widespread distribution of implements peculiar to Indian use. Arrows and spear heads have been found in considerable numbers. Obsidian Cliff was an important quarry, and the open country near the outlet of Yellowstone Lake a favorite camping ground. Certain implements, such as pipes, hammers, and stone vessels, indicating the former presence of a more civilized people, have been found to a limited extent; and some explorers have thought that a symmetrical mound in the valley of the Snake River, below the mouth of Heart River, is of artificial origin. Reference will be made later to the discovery of a rude granite structure near the top of the Grand Teton, which is unquestionably of very ancient date.

Rustic Geyser, in the Heart Lake Geyser Basin, is "bor-

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* For history of this name, see chapter on geographical nomenclature of the Park.

dered by logs which are coated with a crystalline, semi-translucent deposit of geyserite. These logs were evidently placed around the geyser by either Indians or white men a number of years ago, as the coating is thick and the logs firmly attached to the surrounding deposit."*

More recent and perishable proofs of the presence of Indians in the Park were found by the early explorers in the rude wick-e-ups, brush inclosures, and similar contrivances of the lonely Sheepeaters.

The real question of doubt in regard to Indian occupancy of or visits to the Park is therefore not one of fact, but of degree. The Sheepeaters certainly dwelt there; but as to other tribes, their acquaintance with it seems to have been very limited. No word of information about the geyser regions ever fell from their lips, except that the surrounding country was known to them as the Burning Mountains. With one or two exceptions, the old trails were very indistinct, requiring an experienced eye to distinguish them from game trails. Their undeveloped condition indicated infrequent use. Old trappers who knew this region in early times say that the great majority of Indians never saw it. Able Indian guides in the surrounding country became lost when they entered the Park, and the Nez Percés were forced to impress a white man as guide when they crossed it in 1877.

A writer, to whom extended reference will be made in a later chapter, visited the Upper Geyser Basin in 1832, accompanied by two Pend d'Oreilles Indians. Neither of these Indians had ever seen or apparently heard of the geysers, and they "were quite appalled" at the sight of

* Page 298, Twelfth Annual Report of Dr. Hayden. It is more than probable that this was the work of trappers.

them, believing them to be "supernatural" and the "production of the Evil Spirit."

Lieutenant Doane, who commanded the military escort to the Yellowstone Expedition of 1870, says in his report:*

"Appearances indicated that the basin [of the Yellowstone Lake] had been almost entirely abandoned by the sons of the forest. A few lodges of Sheepeaters, a branch remnant of the Snake tribe, wretched beasts who run from the sight of a white man, or from any other tribe of Indians, are said to inhabit the fastnesses of the mountains around the lakes, poorly armed and dismounted, obtaining a precarious subsistence and in a defenseless condition. We saw, however, no recent traces of them. The larger tribes never enter the basin, restrained by superstitious ideas in connection with the thermal springs."

In 1880, Col. P. W. Norris, Second Superintendent of the Park, had a long interview on the shore of the Yellowstone Lake with We-Saw, "an old but remarkably intelligent Indian" of the Shoshone tribe, who was then acting as guide to an exploring party under Governor Hoyt, of Wyoming, and who had previously passed through the Park with the expedition of 1873 under Capt. W. A. Jones, U. S. A. He had also been in the Park region on former occasions. Colonel Norris records the following facts from this Indian's conversation:†

"We-Saw states that he had neither knowledge nor tradition of any permanent occupants of the Park save the timid Sheepeaters. . . . He said that his people (Shoshones), the Bannocks, and the Crows, occasionally visited the Yellowstone Lake and River portions of the Park, but

* Page 26, "Yellowstone Expedition of 1870."

† Page 38, Annual Report of Superintendent of the Park for 1881.

very seldom the geyser regions, which he declared were 'heap, heap, bad,' and never wintered there, as white men sometimes did with horses."

It seems that even the resident Sheepeaters knew little of the geyser basins. General Sheridan, who entered the Park from the South in 1882, makes this record in his report of the expedition:*

"We had with us five Sheep-eating Indians as guides, and, strange to say, although these Indians had lived for years and years about Mounts Sheridan and Hancock, and the high mountains Southeast of the Yellowstone Lake, they knew nothing about the Firehole Geyser Basin, and they exhibited more astonishment and wonder than any of us."

Evidence like the foregoing clearly indicates that this country was *terra incognita* to the vast body of Indians who dwelt around it, and again this singular fact presents itself for explanation. Was it, as is generally supposed, a "superstitious fear" that kept them away? The incidents just related give some color to such a theory; but if it were really true, we should expect to find well authenticated Indian traditions of so marvelous a country. Unfortunately history records none that are worthy of consideration. Only in the names "Yellowstone" and "Burning Mountains" do we find any original evidence that this land of wonders appealed in the least degree to the native imagination.†

The real explanation of this remarkable ignorance appears to us to rest on grounds essentially practical. There was nothing to induce the Indians to visit the Park country. For three-fourths of the year that country is

* Page 11, Report on Explorations of Parts of Wyoming, Idaho and Montana, 1882.

* See, however, Page 45.

inaccessible on account of snow. It is covered with dense forests, which in most places are so filled with fallen timber and tangled underbrush as to be practically impassable. As a game country in those early days it could not compare with the lower surrounding valleys. As a highway of communication between the valleys of the Missouri, Snake, Yellowstone and Bighorn Rivers, it was no thoroughfare. The great routes, except the Bannock trail already described, lay on the outside. All the conditions, therefore, which might attract the Indians to this region were wanting. Even those sentimental influences, such as a love of sublime scenery and a curiosity to see the strange freaks of nature, evidently had less weight with them than with their pale-face brethren.

CHAPTER III.

JOHN COLTER.

The first white man to set foot within the territory of the Yellowstone National Park was the individual whose name stands at the head of this chapter. He first comes to our notice as a private soldier in the expedition of Lewis and Clark. He accompanied these explorers across the continent and as far back as Fort Mandan, the winter quarters of 1804-5. He was a typical frontiersman, though of more than average ability. A man of undaunted courage and incredible endurance, his whole career, so far as we know it, was filled with perilous adventure, and his exploits might pass for fairy tales were they not substantiated by the most reliable evidence. During his service under Lewis and Clark he won the respect and praise of those officers, and his work after he left them has won for him the respect and praise of his posterity.

When Lewis and Clark reached Fort Mandan on their return journey in 1806, Colter appealed to them to be relieved from further service in order that he might remain in the country and trap for beaver. The incident is thus recorded in the journal under date of August 15 and 16, 1806:

"In the evening we were applied to by one of our men, Colter, who was desirous of joining the two trappers who had accompanied us, and who now proposed an expedition up the river, in which they were to find traps and give him a share of the profits. The offer was a very advantageous one, and, as he had always performed his duty, and his

services might be dispensed with, we agreed that he might go, provided none of the rest would ask or expect a similar indulgence. To this they cheerfully answered that they wished Colter every success and would not apply for liberty to separate before we reached St. Louis. We therefore supplied him, as did his comrades also, with powder, lead, and a variety of articles which might be useful to him, and he left us the next day."

To our explorers, just returning from a two years' sojourn in the wilderness, Colter's decision seemed too remarkable to be passed over in silence. The journal continues:

"The example of this man shows us how easily men may be weaned from the habits of civilized life to the ruder but scarcely less fascinating manners of the woods. This hunter has now been absent for many years from the frontier, and might naturally be presumed to have some anxiety, or some curiosity at least, to return to his friends and his country; yet just at the moment when he is approaching the frontiers, he is tempted by a hunting scheme to give up those delightful prospects, and go back without the least reluctance to the solitude of the woods."

Colter remained on the upper rivers until the spring of 1807, but just where, or with what adventure, is not known. After his first winter in the trapping business he decided to return to St. Louis. He set out in a log canoe entirely alone and made his way in safety as far as to the mouth of the Platte River. Here he met an expedition under the celebrated trader, Manuel Lisa, bound for the headwaters of the Missouri to verify the glowing reports brought back by Lewis and Clark concerning the wealth of beaver fur to be found in that region. To Lisa the accession of such a recruit as John Colter, fresh from the very country

Cliff Near Tower Falls.

to which he was going, was a matter of the very highest importance. What inducements were offered we do not know, but enough to decide the self-exiled hunter to give up his return to civilization and to set his face for the third time toward the wilderness.

Nothing occurred on the voyage with which his name is connected until the arrival of the expedition at the mouth of the Bighorn. Lisa had expected to find the Blackfeet nation very hostile, and it may have been a fear of this hostility that caused his unlucky decision to establish himself in the country of their enemies, the Crows. But it seemed that a detachment of Lisa's party met a band of Blackfeet, either before or soon after the arrival at the mouth of the Bighorn, from whom interesting and important information was obtained. Far from being hostile, these Indians evinced a pacific disposition, and said that the provocation under which Captain Lewis had acted in killing one of their number was so obvious and flagrant that they had not cherished this act as a justification of hostility, and were ready to open relations of trade with the whites.

Lisa was greatly pleased at this prospect. He had already arranged to send Colter to notify the surrounding bands of Indians of his arrival, and he probably directed him to proceed also to the Three Forks of the Missouri and confer with the Blackfeet nation. It was a perilous adventure and one requiring great courage and hardihood. "This man," says Brackenridge, "with a pack of thirty pounds weight, his gun and some ammunition, went upward of five hundred miles to the Crow nation; gave them information, and proceeded from thence to several other tribes." It seems that when Lisa arrived in the country the Crows were in the upper end of the valley, probably on Wind

River, and Colter had to travel a long distance to reach them. He then most likely secured the services of a party of the Crows to guide him by the best trail across the mountains, for he would hardly have selected so well by himself what is now, and doubtess was then, the best route through this exceptionally rugged country. All available evidence indicates that Colter traveled directly from Wind River to Pierre's Hole, crossing the Wind River mountains by Union Pass and the Teton Range by Teton Pass. The sublime and wonderful scenery and the remarkable topographical situation by which divergent streams flow from a common neighborhood to widely-separated river systems, and the ease with which the mountains could be crossed,* impressed Colter deeply. When he returned to St. Louis he drew the attention of Clark, Brackenridge and others to these remarkable features.

It is probable that it was in the valley of Pierre's Hole that "the party in whose company he happened to be," was attacked, as related by Brackenridge. This party, according to Biddle, was of the Crow nation and the attacking party were Blackfeet. A fight ensued and Colter, by the necessity of the situation, was compelled to take part with the Crows. He distinguished himself greatly and received a severe wound in the leg. The Blackfeet were defeated,

* "At the head of the Gallatin Fork and of the Grosse Corne of the Yellowstone [the Bighorn River], from discoveries since the voyage of Lewis and Clark, it is found less difficult to cross than the Allegheny mountains. Colter, a celebrated hunter and woodsman, informed me that a loaded wagon would find no obstruction in passing."—Brackenridge. The Gallatin river was mistaken for one of the upper branches of the Yellowstone, probably; but it is clear that Colter here refers to Union or Two-gwo-tee pass at the head of Wind River.

but not until they had seen the pale-face ally of their enemies, to whom, no doubt, they attributed their discomfiture.

The Crows, having conducted their guest across the mountains, and probably not deeming it wise to linger until the vengeance of the Blackfeet should bring reinforcements upon them, left Colter at this point and returned to their country. This conclusion seems certain from Colter's own narrative to Brackenridge, who says that, notwithstanding the wound in his leg, "he returned to the establishment entirely alone and without assistance, several hundred miles." Colter, upon his return to St. Louis, gave to General Clark a description of his route, which the latter placed upon the map accompanying the report of the Lewis and Clark expedition and legended it "Colter's Route in 1807." This map makes it clear that from Pierre's Hole Colter undertook to reach Lisa's fort by the most direct route possible. Such was probably his plan. He knew that it would be folly for him now to proceed to the Three Forks, where he would become an instant victim of Blackfoot vengeance. The best thing to do was to make his way back to the fort and report to Lisa. To go by the way he had come would be to make a long detour and nearly double the distance over a direct line. Colter had a sufficient bump of locality to know that Lisa's fort lay about northeast of his position. He accordingly launched into the dense pine forests that cover the country on the northern flank of the Teton range and the southern portion of the Yellowstone National Park. It may with difficulty be imagined what must have been his astonishment when, emerging from the forests upon the shore of that surpassingly beautiful mountain lake near the source of the Yellowstone River, he found its shores steaming with innumerable boiling springs and

geysers. As a matter of fact Colter's route was carrying him directly across the present Yellowstone Park, from southwest to northeast. He saw the strange phenomena on the shore of Yellowstone Lake, and along the course of its outlet for a distance of some forty miles. There is no record that he ever mentioned having seen the Falls of the Yellowstone, but he could hardly have escaped them, considering the course of his journey as outlined upon the map. He continued down the Yellowstone so long as it bore to the northeast on his general course, but left it by way of the valley of the East Fork, where the river turns abruptly to the northwest.

Such, in the main, is "Colter's route in 1807"—from the mouth of the Bighorn to the forks of the Shoshone River, where he discovered an immense tar spring; thence to the Teton Pass and Pierre's Hole just west of the Teton Range; thence northeast to Yellowstone Lake and down the Yellowstone River to the ford at Tower Falls; thence along the old Indian trail that led out of the Park country, and over into the valley of Clark's Fork; thence back to the forks of the Shoshone, and thence back to Lisa's fort. He did not see the great geyser basins nor Mammoth Hot Springs, but he must have seen the Cañon and Falls of the Yellowstone.

This very remarkable achievement—remarkable in the courage and hardihood of this lone adventurer and remarkable in its unexpected results in geographical discovery—deserves to be classed among the most celebrated performances in the history of American exploration. Colter was the first explorer of the valley of the Bighorn River; the first to cross the passes at the head of Wind River and see the headwaters of the Colorado of the West; the first to see the Teton Mountains, Jackson Hole, Pierre's Hole, and the

source of the Snake River; and most important of all, the first to pass through that singular region which has since become known throughout the world as the Yellowstone Wonderland. He also saw the immense tar spring at the forks of the Shoshone River, a spot which came to bear the name of "Colter's Hell."

Colter had now accomplished enough to entitle him to lasting distinction in the cause of geographical exploration; but honors of a more perilous character still awaited him. As soon as spring opened—for he could not have returned to Lisa's fort before the arrival of winter—Lisa dispatched him again to visit the Blackfeet. He set out directly for the Three Forks of the Missouri, where he seems to have employed his time trapping until the Indians put in an appearance. He was accompanied on this expedition by a companion named Potts, very likely the same one who had been a fellow soldier in the Lewis and Clark expedition. Biddle relates that when these two men met the Blackfeet these Indians did not even yet evince hostile intentions, but that an altercation soon ensued, ending in a combat in which Potts was killed and Colter made his escape. This affair was probably the same as that related by John Bradbury in his "Travels in North America," and better known through Irving's "Astoria." Colter gave the account of his miraculous escape to the English naturalist immediately after his return to St. Louis in the spring of 1810. All other accounts are based upon Bradbury's. The simple and direct language in which the author has clothed his recital tells the story so well that even the skilful pen of Irving adopted it almost without change. The adventure is one of those remarkable experiences which have now and then occurred in our frontier history, almost beyond credibility,

but nevertheless in their details clearly possible. The story is here repeated in the exact words of Bradbury:

"This man came to St. Louis in May, 1810, in a small canoe, from the headwaters of the Missouri, a distance of three thousand miles, which he traversed in thirty days. I saw him on his arrival, and received from him an account of his adventures after he had separated from Lewis and Clark's party; one of these, from its singularity, I shall relate. On the arrival of the party at the headwaters of the Missouri, Colter, observing an appearance of abundance of beaver there, got permission to remain and hunt for some time, which he did in company with a man by the name of Dixon, who had traversed the immense tract of country from St. Louis to the headwaters of the Missouri alone.

"Soon after he separated from Dixon and trapped in company with a hunter named Potts; and aware of the hostility of the Blackfeet Indians, one of whom had been killed by Lewis, they set their traps at night, and took them up early in the morning, remaining concealed during the day. They were examining their traps early one morning, in a creek about six miles from that branch of the Missouri called Jefferson's Fork, and were ascending in a canoe, when they suddenly heard a great noise, resembling the trampling of animals; but they could not ascertain the fact, as the high perpendicular banks on each side of the river impeded their view. Colter immediately pronounced it to be occasioned by Indians, and advised an instant retreat; but was accused of cowardice by Potts, who insisted that the noise was caused by buffaloes, and they proceeded on. In a few minutes afterward their doubts were removed by a party of Indians making their appearance on both sides of the creek, to the amount of five or six hundred, who beckoned them to come ashore. As retreat was now impossible, Colter turned the head of the canoe to the shore; and

at the moment of its touching an Indian seized the rifle belonging to Potts; but Colter (who is a remarkably strong man), immediately retook it, and handed it to Potts, who remained in the canoe, and on receiving it pushed off into the river. He had scarcely quitted the shore when an arrow was shot at him, and he cried out, 'Colter, I am wounded.' Colter remonstrated with him on the folly of attempting to escape, and urged him to come ashore. Instead of complying, he instantly leveled his rifle at an Indian, and shot him dead on the spot. This conduct, situated as he was, may appear to have been an act of madness; but it was doubtless the effect of sudden and sound reasoning; for if taken alive he must have expected to be tortured to death, according to their custom. He was instantly pierced with arrows so numerous that, to use the language of Colter, 'he was made a riddle of.'

"They now seized Colter, stripped him entirely naked, and began to consult on the manner in which he should be put to death. They were first inclined to set him up as a mark to shoot at; but the chief interfered, and seizing him by the shoulder, asked him if he could run fast. Colter, who had been some time amongst the Kee-kat-sa, or Crow Indians, had in a considerable degree acquired the Black-foot language, and was also well acquainted with Indian customs. He knew that he had now to run for his life, with the dreadful odds of five or six hundred against him, and those armed Indians; therefore he cunningly replied that he was a very bad runner, although he was considered by the hunters as remarkably swift. The chief now commanded the party to remain stationary, and led Colter out on the prairie three or four hundred yards, and released him, bidding him to save himself if he could. At that instant the horrid war whoop sounded in the ears of poor

Colter, who, urged with the hope of preserving life, ran with a speed at which he was himself surprised. He proceeded toward the Jefferson Fork, having to traverse a plain six miles in breadth, abounding with prickly pear, on which he was every instant treading with his naked feet. He ran nearly half way across the plain before he ventured to look over his shoulder, when he perceived that the Indians were very much scattered, and that he had gained ground to a considerable distance from the main body; but one Indian, who carried a spear, was much before all the rest, and not more than a hundred yards from him. A faint gleam of hope now cheered the heart of Colter; he derived confidence from the belief that escape was within the bounds of possibility; but that confidence was nearly fatal to him, for he exerted himself to such a degree that the blood gushed from his nostrils, and soon almost covered the fore part of his body.

"He had now arrived within a mile of the river, when he distinctly heard the appalling sound of footsteps behind him, and every instant expected to feel the spear of his pursuer. Again he turned his head, and saw the savage not twenty yards from him. Determined if possible to avoid the expected blow, he suddenly stopped, turned round, and spread out his arms. The Indian, surprised by the suddenness of the action, and perhaps of the bloody appearance of Colter, also attempted to stop; but exhausted with running, he fell whilst endeavoring to throw his spear, which stuck in the ground and broke in his hand. Colter instantly snatched up the pointed part, with which he pinned him to the earth, and then continued his flight. The foremost of the Indians, on arriving at the place, stopped till others came up to join them, when they set up a hideous yell. Every moment of this time was improved by

Colter, who, although fainting and exhausted, succeeded in gaining the skirting of the cottonwood trees, on the borders of the fork, through which he ran and plunged into the river. Fortunately for him, a little below this place there was an island, against the upper point of which a raft of drift timber had lodged. He dived under the raft, and after several efforts, got his head above water amongst the trunks of trees, covered over with smaller wood to the depth of several feet. Scarcely had he secured himself when the Indians arrived on the river, screeching and yelling, as Colter expressed it, 'like so many devils.' They were frequently on the raft during the day, and were seen through the chinks by Colter, who was congratulating himself on his escape, until the idea arose that they might set the raft on fire.

"In horrible suspense he remained until night, when hearing no more of the Indians, he dived from under the raft, and swam silently down the river to a considerable distance, when he landed, and traveled all night. Although happy in having escaped from the Indians, his situation was still dreadful; he was completely naked, under a burning sun; the soles of his feet were entirely filled with the thorns of the prickly pear; he was hungry, and had no means of killing game, although he saw abundance around him, and was at least seven days' journey from Lisa's fort, on the Bighorn branch of the Roche Jaune River. These were circumstances under which almost any man but an American hunter would have despaired. He arrived at the fort in seven days, having subsisted on a root much esteemed by the Indians of the Missouri, now known by naturalists as *psoralea esculenta.*"

From this time on deadly enmity toward the white race became the settled policy of the Blackfeet Indians. There

is probably little doubt that it was the apparent favoritism of the white traders toward their enemies, the Crows, that turned the scale. For this appearance the action of Lisa in building his first post in Crow territory, and Colter's accidental presence in the ranks of the Crows when these Indians were attacked by the Blackfeet, are mainly responsible. Colter thus became in part the involuntary cause of that deadly feud which lasted beyond the lifetime of any of his contemporaries.

Colter remained on the upper rivers until after Lisa's return in the summer of 1809 with an extensive outfit of the newly formed St. Louis Missouri Fur Company. But he very wisely abandoned the country before the disastrous events of 1810 at the Three Forks of the Missouri. He set out for St. Louis about April 1st of that year, and made the descent of the rivers in thirty days, a distance, according to his own estimate, of some three thousand miles. He remained in St. Louis for a considerable time, and evidently talked a great deal about his adventures. He gave Clark important data for his forthcoming map of the Lewis and Clark expedition. He succeeded in making himself accounted a confirmed prevaricator. No author or map-maker would jeopardize the success of his work by incorporating in it such incredible material as Colter furnished. His stories were not believed; their author became the subject of jest and ridicule; and the region of his adventures was long derisively known as "Colter's Hell."*

* This name early came to be restricted to the locality where Colter discovered the tar spring on the Shoshone, probably because few trappers ever saw the other similar localities visited by him. But Colter's descriptions, so well summed up by Irving in his "Captain Bonneville," undoubtedly refer in large part to what he saw in the Yellowstone and Snake River Valleys

Among those who esteemed Colter's accounts of sufficient importance to merit attention may be mentioned Gen. William Clark, Henry M. Brackenridge, the author, and John Bradbury, the English naturalist. He was seen by Bradbury in the spring of 1810, immediately after his return to St. Louis. Bradbury also spent the forenoon of March 18, 1811, with Colter while en route up the Missouri with the Astoria expedition of that year. Colter had lately married and was living near the river above the point where the little creek La Charette empties into the main stream. He was full of admonitions in regard to the Blackfeet, and urged the most careful measures to prevent trouble with them. As he saw the well appointed expedition setting out for the mountains, the old fever seized him again and he was upon the point of joining the party. But what the hardships of the wilderness and the pleasures of civilization could not dissuade him from doing, the charms of a newly-married wife easily accomplished. Colter remained behind; and here the curtain of oblivion falls upon the discoverer of the Yellowstone.*

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* This is the last positive record that we have of John Colter. In the *Louisiana Gazette*, St. Louis, December 11, 1813, there appeared a notice by the administrator of the estate of "John Coulter, deceased," calling for a settlement of all claims for or against the estate. The final settlement left a balance in favor of the estate of $229.41¾. The deceased may or may not have been the subject of this sketch.

CHAPTER IV.

THE TRADER AND TRAPPER.

For fifty years after Lewis and Clark returned from their expedition, the headwaters of the Yellowstone remained unexplored except by the trader and trapper. It was the traffic in peltries that first induced extensive exploration of the West. Concerning the precious metals, the people seem to have had little faith in their abundant existence there, and no organized search for them was made in the earlier years of the century. But that country, even in its unsettled state, had other and important sources of wealth. Myriads of beaver inhabited the streams and innumerable buffalo roamed the valleys. The buffalo furnished the trapper with means of subsistence, and beaver furs were better than mines of gold. Far in advance of the tide of settlement the lonely trapper, and after him the trader, penetrated the unknown West. Gradually the enterprise of individuals crystallized around a few important nuclei and there grew up those great fur-trading companies which for many years exercised a kind of paternal sway over the Indians and the scarcely more civilized trappers. A brief resumé of the history of these companies will show how important a place they occupy in the early history of the Upper Yellowstone.

The climax of the western fur business may be placed at about the year 1830. At that time three great companies operated in territories whose converging lines of separation centered in the region about Yellowstone Lake. The oldest and most important of them, and the one destined to out-

live the others, was the world-renowned Hudson's Bay Company. It was at that time more than a century and a half old. Its earlier history was in marked contrast with that of later years. Secure in the monopoly which its extensive charter rights guaranteed, it had been content with substantial profits and had never pushed its business far into the new territory nor managed it with aggressive vigor. It was not until forced to action by the encroachments of a dangerous rival that it became the prodigious power of later times.

This rival was the great Northwest Fur Company of Montreal. It had grown up since the French and Indian War, partly as a result of that conflict, and finally took corporate form in 1787. It had none of the important territorial rights of the Hudson's Bay Company, but its lack of monopoly was more than made up by the enterprise of its promoters. With its bands of Canadian frontiersmen, it boldly penetrated the northwest and paid little respect to those territorial rights which its venerable rival was powerless to enforce. It rapidly extended its operations far into the unexplored interior. Lewis and Clark found its traders among the Mandans in 1804. In 1811 the Astorians saw its first party descend the Columbia to the sea. Two years later the American traders on the Pacific Coast were forced to succumb to their British rivals.

A long and bitter strife now ensued between the two British companies. It even assumed the magnitude of civil war, and finally resulted in a frightful massacre of unoffending colonists. The British government interfered and forced the rivals into court, where they were brought to the verge of ruin by protracted litigation. A compromise was at last effected in 1821 by an amalgamation of the two companies under the name of the older rival.

But in the meantime a large part of their best fur country had been lost. In 1816 the government of the United States excluded British traders from its territory east of the Rocky Mountains. To the west of this limit, however, the amalgamated company easily forced all its rivals from the field. No American fur company ever attained the splendid organization, nor the influence over the Indians, possessed by the Hudson's Bay Company. At the time of which we write it was master of the trade in the Columbia River Valley, and the eastern limit of its operations within the territory of the United States was nearly coincident with the present western boundary of the Yellowstone Park.

The second of the great companies to which reference has been made was the American Fur Company. It was the final outcome of John Jacob Astor's various attempts to control the fur trade of the United States. Although it was incorporated in 1808, it was for a time overshadowed by the more brilliant enterprises known as the Pacific Fur Company and the Southwest Fur Company. The history of Mr. Astor's Pacific Fur Company, the dismal experiences of the Astorians, and the deplorable failure of the whole undertaking, are matters familiar to all readers of Irving's "Astoria."

The other project gave for a time more substantial promise of success. A British company of considerable importance, under the name of the Mackinaw Company, with headquarters at Michilimacinac, had for some time operated in the country about the headwaters of the Mississippi now included in the States of Wisconsin and Minnesota. Astor formed a new company, partly with American and partly with Canadian capital, bought out the Mackinaw Company and changed its name to Southwest

Fur Company. But scarcely had its promising career begun when it was cut short by the War of 1812.

The failure of these two attempts caused Mr. Astor to turn to the old American Fur Company. The exclusion Act of 1816 enabled him to buy at his own price the Northwest Fur Company's posts on the upper rivers, and the American Company rapidly extended its trade over all the country, from Lake Superior to the Rocky Mountains. Its posts multiplied in every direction, and at an early date steamboats began to do its business up the Missouri River from St. Louis. It gradually absorbed lesser concerns, such as the Missouri Fur Company, and the Columbia Fur Company, and by 1830 was complete master of the trade throughout the Missouri Valley. In 1834, Astor sold his interests to Pratte, Chouteau and Company, of St. Louis, and retired from the business. At this time the general western limit of the territory operated in by this formidable company was the northern and eastern slope of the mountains which bound the Yellowstone Park on the north and east. Its line of operations was down the river to St. Louis, and its trading posts were located at frequent intervals between.

The third of the great rival companies was the Rocky Mountain Fur Company, which was founded in St. Louis in 1822 by Gen. W. H. Ashley, and received its full organization in 1826 under the direction of Jedediah S. Smith, David Jackson and William L. Sublette. Among the leading spirits, who at one time or another guided its affairs, was the famous mountaineer, James Bridger, to whom frequent reference will be made.

This company had its general center of operations on the headwaters of Green River to the west of South Pass. Unlike the other companies, it had no navigable stream

along which it could establish posts and conduct its operations. By the necessities of its exclusively mountain trade it developed a new feature of the fur business. The *voyageur,* with his canoe and oar, gave way to the mountaineer, with his saddle and rifle. The trading post was replaced by the annual "rendezvous," which was in many points the forerunner of the later cattle "roundups" of the plains. These rendezvous were agreed upon each year at localities best suited to the convenience of the trade. Hither in the spring came from the east convoys of supplies for the season's use. Hither repaired also the various parties of hunters and trappers and such bands of Indians as roamed in the vicinity. These meetings were great occasions, both in the transaction of business and in the round of festivities that always prevailed. After the traffic of the occasion was over, and the plans for the ensuing year were agreed upon, the convoys returned to the States and the trappers to their retreats in the mountains. The field of operations of this company was very extensive and included about all of the West not controlled by the Hudson's Bay and American Fur Companies.

Thus was the territory of the great West practically parceled out among these three companies. It must not be supposed that there was any agreement, tacit or open, that each company should keep within certain limits. There were a few temporary arrangements of this sort, but for the most part each company maintained the right to work in any territory it saw fit, and there was constant invasion by each of the proper territories of the other. But the practical necessities of the business kept them, broadly speaking, within the limits which we have noted. The roving bands of "free trappers" and "lone traders," and individual expeditions like those of Captain Bonneville and

TETON MOUNTAINS AND JACKSON LAKE.

Nathaniel J. Wyeth, acknowledged allegiance to none of the great organizations, but wandered where they chose, dealing by turns with each of the companies.

The vigor and enterprise of these traders caused their business to penetrate the remotest and most inaccessible corners of the land. *Silliman's Journal* for January, 1834, declares that—

"The mountains and forests, from the Arctic Sea to the Gulf of Mexico, are threaded through every maze by the hunter. Every river and tributary stream, from the Columbia to the Rio del Norte, and from the Mackenzie to the Colorado of the West, from their headwaters to their junctions, are searched and trapped for beaver."

That a business of such all-pervading character should have left a region like our present Yellowstone Park unexplored would seem extremely doubtful. That region lay, a sort of neutral ground, between the territories of the rival fur companies. Its streams abounded in beaver; and, although hemmed in by vast mountains, and snow-bound most of the year, it could not have escaped discovery. In fact, every part of it was repeatedly visited by trappers. Rendezvous were held on every side of it, and once, it is believed, in Hayden Valley, just north of Yellowstone Lake. Had the fur business been more enduring, the geyser regions would have become known at least a generation sooner than they were.

But a business carried on with such relentless vigor naturally soon taxed the resources of nature beyond its capacity for reproduction. In regions under the control of a single organization, as in the vast domains of the Hudson's Bay Company, great care was taken to preserve the fur-bearing animals from extinction; but in United States territory, the exigencies of competition made any

such provision impossible. The poor beaver, as at a later day the buffalo, quickly succumbed to his ubiquitous enemies. There was no spot remote enough for him to build his dam in peace, and the once innumerable multitude speedily dwindled away. The few years immediately preceding and following 1830 were the halcyon days of the fur trade in the United States. Thenceforward it rapidly declined, and by 1850 had shrunk to a mere shadow of its former greatness. With its disappearance the early knowledge of the Upper Yellowstone also disappeared. Subsequent events—the Mormon emigration, the war with Mexico, and the discovery of gold—drew attention, both private and official, in other directions; and the great wonderland became again almost as much unknown as in the days of Lewis and Clark.

CHAPTER V.

EARLY KNOWLEDGE OF THE YELLOWSTONE.

On the west bank of the Yellowstone River, a quarter of a mile above the Upper Falls, in a ravine now crossed by a lofty wooden bridge, stands a tree, on which is the oldest record, except that of Colter, of the presence of white men within the limits of the Park. It is an inscription, giving the initials of a name and the date when inscribed. It was discovered in 1880 by Col. P. W. Norris, then Superintendent of the Park. It is now practically illegible from overgrowth, although some of the characters can still be made out. Col. Norris, who saw it in the year 1880, claims to have successfully deciphered it. He verified the date by counting the annual rings on another tree near by, which bore hatchet marks, presumably of the same date. The time that had elapsed since these cuts were made corresponded well with the inscribed date. The inscription was:

J O R
Aug 19 1819

Efforts have been made to trace this inscription to some of the early noted trappers, but the attempt can hardly succeed. Even if an identity of initials were established, the identity of individuals would still remain in doubt. Nothing short of some authentic record of such a visit as must have taken place can satisfy the requirements of the case. In the absence of any such record, the most that can be said is that the inscription is proof positive that the Park country was visited by white men, after Colter's time, fully fifty years before its final discovery.

Col. Norris' researches disclosed other similar evidence, although in no other instance with so plain a clue as to date. Near Beaver Lake and Obsidian Cliff, he found, in 1878, a cache of marten traps of an old pattern used by the Hudson's Bay Company trappers fifty years before. He also examined the ruins of an ancient block-house discovered by Frederick Bottler at the base of Mt. Washburn, near the Grand Cañon of the Yellowstone. Its decayed condition indicated great age. In other places the stumps of trees, old logs used to cross streams, and many similar proofs were brought to light by that inveterate ranger of the wilderness.

The Washburn party, in 1870, discovered on the east bank of the Yellowstone, just above Mud Geyser, the remains of a pit, probably once used for concealment in shooting water fowl.

A book called "The River of the West,"* published in 1871, but copyrighted in 1869, before the publication of any modern account of the geyser regions, contains the record of an adventure in the Yellowstone country about the year 1829. The book is a biography of one Joseph Meek, a trapper and pioneer of considerable note. The adventure to which reference is made took place in 1829, and was the result of a decision by the Rocky Mountain Fur Company to retire from competition with the Hudson's Bay Company in the Snake River Valley. In leaving the country, Capt. William Sublette, the chief partner, led his party up Henry Fork, across the Madison and Gallatin Rivers, to the high ridge overlooking the Yellowstone, at some point near the present Cinnabar Mountain. Here the party was dispersed by a band of Blackfeet, and Meek,

* By Mrs. Frances Fuller Victor, an eminent authority upon the history of the Northwest coast.

one of its members, became separated from his companions. He had lost his horse and most of his equipment, and in this condition he wandered for several days, without food or shelter, until he was found by two of his companions. His route lay in a southerly direction, to the eastward of the Yellowstone, at some distance back from the river. On the morning of the fifth day he had the following experience:

"Being desirous to learn something of the progress he had made, he ascended a low mountain in the neighborhood of his camp, and behold! the whole country beyond was smoking with vapor from boiling springs, and burning with gases issuing from small craters, each of which was emitting a sharp, whistling sound. When the first surprise of this astonishing scene had passed, Joe began to admire its effect from an artistic point of view. The morning being clear, with a sharp frost, he thought himself reminded of the city of Pittsburg, as he had beheld it on a winter morning, a couple of years before. This, however, related only to the rising smoke and vapor; for the extent of the volcanic region was immense, reaching far out of sight. The general face of the country was smooth and rolling, being a level plain, dotted with cone-shaped mounds. On the summit of these mounds were small craters from four to eight feet in diameter. Interspersed among these on the level plain were larger craters, some of them from four to six miles across. Out of these craters issued blue flames and molten brimstone."*

Making some allowance for the trapper's tendency to exaggeration, we recognize in this description the familiar picture of the hot springs districts. The precise location

* Page 75, "River of the West."

is difficult to determine; but Meek's previous wanderings, and the subsequent route of himself and his companions whom he met here, show conclusively that it was one of the numerous districts east of the Yellowstone, which were possibly then more active than now.

This book affords much other evidence of early knowledge of the country immediately bordering the present Park. The Great Bend of the Yellowstone where Livingston now stands, was already a famous rendezvous, and the Gardiner and Firehole Rivers were well known to the trappers.

In the *Louisiana Gazette,* of St. Louis, February 28, 1811, is an article upon Louisiana from the pen of a then popular writer, Henry M. Brackenridge. In it occurs a reference to this region which no doubt originated with John Colter: "I think it probable that, on a close examination of the country, evident traces of extinguished volcanoes will be discovered. Mr. Lisa informs me that about sixty miles from his fort (at the mouth of the Bighorn) there is a volcano that actually emits flames. In this tract immense quantities of sulphur can be procured. It is not only found in caves, but can be scraped off the prairie in the manner of salt." This is only one of a number of references from early writings that indicate the presence of volcanic activity on a moribund scale in the Rocky Mountains as late as the beginning of the Nineteenth Century.

Among the employes of the American Fur Company in the decade from 1830 to 1840, was one Warren Angus Ferris, clerk, to whom belongs the honor of having written the first actual description of the Firehole Geyser Basins. Ferris was attached to the mountain expeditions of the American Fur Company, and in the course of his five

years' service (1831-5) saw pretty nearly all the country around the Yellowstone Park. He had heard rumors of the strange phenomena which are now so well known, and in the spring of 1834, while returning south from the Flathead country, where he had spent the winter, he made a visit to the geyser basins for the purpose of verifying or refuting these reports. He made the journey from a point near where Beaver Cañon Station, on the Utah Northern Railroad, now stands, and traveled almost west to the geyser basins. He was among the geysers on the 20th of May, 1834. In spite of some discrepancies in his account, it is reasonably certain that the point visited was the Upper Geyser Basin. Following is his narrative of the visit:*

"I had heard in the summer of 1833, while at rendezvous, that remarkable boiling springs had been discovered on the sources of the Madison, by a party of trappers, in their spring hunt; of which the accounts they gave, were so very astonishing, that I determined to examine them myself, before recording their description, though I had the united testimony of more than twenty men on the subject, who all declared they saw them, and that they really were as extensive and remarkable as they had been described. Having now an opportunity of paying them a visit, and as another or a better might not occur, I parted

* Ferris followed the practice of keeping a journal, and after his return from the mountains published it in the *Western Literary Messenger*, of Buffalo, New York. The article quoted below was republished in the *Wasp*, of Nauvoo, Illinois, a Mormon paper, August 13, 1842, and later became well known. Where it came from, or who its author was, no one in recent years knew until in the fall of 1900 the series of articles in the *Literary Messenger* was discovered by Mr. O. D. Wheeler, of St. Paul. Ferris was born at Glen Falls, N. Y., Dec. 20, 1810; and died at Reinhardt, Texas, February 8, 1873.

with the company after supper, and taking with me two Pend d'Oreilles (who were induced to take the excursion with me, by the promise of an extra present,) set out at a round pace, the night being clear and comfortable. We proceeded over the plain about twenty miles, and halted until daylight, on a fine spring, flowing into Camas Creek. Refreshed by a few hours' sleep, we started again after a hasty breakfast, and entered a very extensive forest, called the Pine Woods; (a continued succession of low mountains or hills, entirely covered with a dense growth of this species of timber;) which we passed through and reached the vicinity of the springs about dark, having seen several lakes or ponds on the sources of the Madison, and rode about forty miles; which was a hard day's ride, taking into consideration the rough irregularity of the country through which we traveled.

"We regaled ourselves with a cup of coffee, the materials for making which we had brought with us, and immediately after supper, lay down to rest, sleepy and much fatigued. The continual roaring of the springs, however, (which was distinctly heard,) for some time prevented my going to sleep, and excited an impatient curiosity to examine them, which I was obliged to defer the gratification of until morning, and filled my slumbers with visions of water-spouts, cataracts, fountains, *jets d'eau* of immense dimensions, etc., etc.

"When I arose in the morning, clouds of vapor seemed like a dense fog to overhang the springs, from which frequent reports or explosions of different loudness, constantly assailed our ears. I immediately proceeded to inspect them, and might have exclaimed with the Queen of Sheba, when their full reality of dimensions and novelty burst upon my view, 'the half was not told me.'

"From the surface of a rocky plain or table, burst forth columns of water, of various dimensions, projecting high in the air, accompanied by loud explosions, and sulphurous vapors, which were highly disagreeable to the smell. The rock from which these springs burst forth was calcareous, and probably extended some distance from them, beneath the soil. The largest of these beautiful fountains projects a column of boiling water several feet in diameter, to the height of more than one hundred and fifty feet, in my opinion; but the party of Alvarez,* who discovered it, persist in declaring that it could not be less than four times that distance in height—accompanied with a tremendous noise. These explosions and discharges occur at intervals of about two hours. After having witnessed three of them, I ventured near enough to put my hand into the waters of its basin, but withdrew it instantly, for the heat of the water in this immense chaldron was altogether too great for my comfort; and the agitation of the water, the disagreeable effluvium continually exuding, and the hollow, unearthly rumbling under the rock on which I stood, so ill accorded with my notions of personal safety, that I retreated back precipitately to a respectful distance. The Indians, who were with me, were quite appalled, and could not by any means be induced to approach them. They seemed astonished at my presumption in advancing up to the large one, and when I safely returned, congratulated me upon my 'narrow escape.' They believed them to be supernatural and supposed them to be the production of the Evil Spirit. One of them remarked that hell, of which he had heard from the whites, must be in that vicinity. The diameter of the basin into which the waters of the largest jet principally fall, and from the center of which, through a hole

* An American Fur Company clerk.

in the rock, of about nine or ten feet in diameter, the water spouts up as above related, may be about thirty feet. There are many other smaller fountains, that did not throw their waters up so high, but occurred at shorter intervals. In some instances the volumes were projected obliquely upward, and fell into the neighboring fountains, or on the rock or prairie. But their ascent was generally perpendicular, falling in and about their own basins or apertures.

"These wonderful productions of nature are situated near the center of a small valley, surrounded by pine-covered hills, through which a small fork of the Madison flows."

Here we have a description free from exaggeration and reasonably true to the facts. No one who has seen the Upper Geyser Basin will question its general correctness. The writer then goes on to relate what he has learned from others, but here exaggeration creeps in and this part of his narrative is less reliable. It continues:

"From several trappers who had recently returned from the Yellow Stone, I received an account of boiling springs that differ from those seen on Salt River only in magnitude, being on a vastly larger scale; some of their cones are from twenty to thirty feet high, and forty to fifty paces in circumference. Those which have ceased to emit boiling water, vapor, etc., of which there were several, are full of shelving cavities, even some fathoms in extent, which give them, inside, an appearance of honey-comb. The ground for several acres' extent in vicinity of the springs is evidently hollow, and constantly exhales a hot steam or vapor of disagreeable odor, and a character entirely to prevent vegetation. They are situated in the valley at the head of that river near the lake, which constitutes its source.

"A short distance from these springs, near the margin of

the lake, there is one quite different from any yet described. It is of a circular form, several feet in diameter, clear, cold and pure; the bottom appears visible to the eye, and seems seven or eight feet below the surface of the earth or water, without meeting any resistance. What is most singular with respect to this fountain is the fact that at regular intervals of about two minutes, a body or column of water bursts up to the height of eight feet, with an explosion as loud as the report of a musket, and then falls back into it; for a few seconds the water is roily, but it speedily settles and becomes transparent as before the effusion. A slight tremulous motion of the water, and a low rumbling sound from the caverns beneath, precede each explosion. This spring was believed to be connected with the lake by some subterranean passage, but the cause of its periodical eruptions or discharges, is entirely unknown. I have never before heard of a cold spring, whose waters exhibit the phenomena of periodical explosive propulsion, in form of a jet. The geysers of Iceland, and the various other European springs, the waters of which are projected upwards, with violence and uniformity, as well as those seen on the head waters of the Madison, are invariably hot."

The whole article forms the most interesting and authentic reference to the geyser regions published prior to 1870. It proves beyond question that a knowledge of this region existed among the early trappers, and confirms our previous deduction that the wide range of the fur business could not have left it unexplored.

A brief but interesting reference to this region is found in the following extract from a letter by Father De Smet, dated at the University of St. Louis, January 20, 1852, describing a journey made by him in 1851 from Fort

Union, at the mouth of the Yellowstone, to Fort Laramie, on the Platte:

"Near the source of the River Puante [Stinking Water, now called Shoshone], which empties into the Big Horn, and the sulphurous waters of which have probably the same medicinal qualities as the celebrated Blue Lick Springs of Kentucky, is a place called *Colter's Hell*—from a beaver-hunter of that name. This locality is often agitated with subterranean fires. The sulphurous gases which escape in great volumes from the burning soil infect the atmosphere for several miles, and render the earth so barren that even the wild wormwood can not grow on it. The beaver-hunters have assured me that the underground noises and explosions are often frightful.

"However, I think that the most extraordinary spot in this respect, and perhaps the most marvelous of all the northern half of this continent, is in the very heart of the Rocky Mountains, between the 43d and 45th degrees of latitude, and the 109th and 111th degrees of longitude; that it, between the sources of the Madison and the Yellowstone. It reaches more than a hundred miles. Bituminous, sulphurous and boiling springs are very numerous in it. The hot springs contain a large quantity of calcareous matter, and form hills more or less elevated, which resemble in their nature, perhaps, if not in their extent, the famous springs of Pemboukkalesi, in Asia Minor, so well described by Chandler. The earth is thrown up very high, and the influence of the elements causes it to take the most varied and the most fantastic shapes. Gas, vapor and smoke are continually escaping by a thousand openings from the base to the summit of the volcanic pile; the noise at times resembles the steam let off by a boat. Strong, subterranean explosions occur like those in *'Colter's Hell.'*

The hunters and the Indians speak of it with a superstitious fear, and consider it the abode of evil spirits, that is to say, a kind of hell. Indians seldom approach it without offering some sacrifice, or, at least, without presenting the calumet of peace to the turbulent spirits, that they may be propitious. They declare that the subterranean noises proceed from the forging of warlike weapons; each eruption of the earth is, in their eyes, the result of a combat between the infernal spirits, and becomes the monument of a new victory or calamity. Near Gardiner River, a tributary of the Yellowstone, and in the vicinity of the region I have just been describing, there is a mountain of sulphur. I have this report from Captain Bridger, who is familiar with every one of these mounds, having passed thirty years of his life near them."

This very accurate description is the first that defines correctly the geographical location of the geyser regions.

The most comprehensive of these early references to the natural phenomena of the Upper Yellowstone is the following extract from Gunnison's "History of the Mormons" (1852), and comes directly from James Bridger:

"He [Bridger] gives a picture, most romantic and enticing, of the head waters of the Yellowstone. A lake, sixty miles long, cold and pellucid, lies embosomed among high precipitous mountains. On the west side is a sloping plain, several miles wide, with clumps of trees and groves of pine. The ground resounds with the tread of horses. Geysers spout up seventy feet high, with a terrific, hissing noise, at regular intervals. Waterfalls are sparkling, leaping and thundering down the precipices, and collect in the pool below. The river issues from this lake, and for fifteen miles roars through the perpendicular cañon at the outlet. In this section are the 'Great Springs,' so hot that

meat is readily cooked in them, and as they descend on the successive terraces, afford at length delightful baths. On the other side is an acid spring, which gushes out in a river torrent; and below is a cave, which supplies 'vermillion' for the savages in abundance."

In this admirable summary we readily discover the Yellowstone Lake, the Grand Cañon, the Falls, the geyser basins, the Mammoth Hot Springs, and Cinnabar Mountain. Prior to 1860, Bridger had related these accounts to Captain Warren, Captain Raynolds, Doctor Hayden, and others, and although he seems to have convinced these gentlemen that there was something in his stories. they still attributed less to fact than to fancy.

There are numerous other interesting, though less definite, references to an early knowledge of the Yellowstone; but those we have given show their general character. The important fact to remember is that this knowledge was barren of result. For the most part it existed only in the minds of illiterate men, and perished with them. It never caught the public ear and did not in the least degree hasten the final discovery.

CHAPTER VI.

JAMES BRIDGER AND HIS STORIES.

This celebrated hunter, trader and guide, whose name and career are a part of the pioneer history of the West, was thoroughly familiar with the region now comprised in the Yellowstone Park. His personal knowledge of it dates back as far as 1830. He often visited it, not like Ferris in a single locality, but in all its parts, and was well acquainted with its wonderful features. In his efforts to disseminate the knowledge he had acquired, he was as persistent as Colter had been before him, and with little better success. He tried to get his descriptions before the public, but no periodical or newspaper would lend itself to his service. The editor of a leading western paper stated in 1879 that Bridger had told him of the Yellowstone wonders fully thirty years before. He prepared an article from his description and then suppressed it, "because a man who claimed to know Bridger told him he would be laughed out of town if he printed any of 'old Jim Bridger's lies.'" In later years this editor publicly apologized to Bridger for having doubted his statements.

Certain personal characteristics of Bridger aggravated this lack of confidence in what he said. He was the greatest romancer of the West in his time, and his reckless exaggerations won for him a reputation which he could not shake off when he wanted to. Accordingly, the truths that he told about the Yellowstone were classed with his fairy tales of the same region, and both were set down as the harmless vaporings of a mind to which truth had long been a stranger.

Some of the creations ascribed to him have survived to this day. We say "ascribed," for in reality they are no one person's production, but are the development of many years and many minds. They all have a basis in fact—the "soul of truth," which a great philosopher has said "exists in things erroneous." In some cases the basis is pretty hard to discover, and it is easier to believe the embellished tale than its descent from the fact when once found. It is stated by an adept in this accomplishment that constant repetition and enlargement of his imaginary experiences eventually leads him to believe them true, and this may have been the case with Bridger himself. In any event, it is a fortunate thing that these stories grow and develop with time, gravitating always from the real to the ideal; and he is to be pitied who feels an unseemly anxiety for the basic facts or would rob them of a single increment which the rolling years have given them.

The few that are recorded here may be credited to Bridger without exciting the envy of rival experts in the same line. The first relates to the celebrated Obsidian Cliff, a mass of black volcanic glass with which all tourists in the Park become familiar. Its discovery by Bridger was the result of one of his hunting trips, and it happened in this wise.

Coming one day in sight of a magnificent elk, he took careful aim at the unsuspecting animal and fired. To his great amazement, the elk not only was not wounded, but seemed not even to have heard the report of the rifle. Bridger drew considerably nearer and gave the elk the benefit of his most deliberate aim; but with the same result as before. A third and a fourth effort met with a similar fate. Utterly exasperated, he seized his rifle by the barrel, resolved to use it as a club since it had failed as a firearm.

He rushed madly toward the elk, but suddenly crashed into an immovable vertical wall which proved to be a mountain of perfectly transparent glass, on the farther side of which, still in peaceful security, the elk was quietly grazing. Stranger still, the mountain was not only of pure glass, but was a perfect telescopic lens, and, whereas, the elk seemed but a few hundred yards off, it was in reality twenty-five miles away!

Another of Bridger's discoveries was an ice-cold spring near the summit of a lofty mountain, the water from which flowed down over a long smooth slope, where it acquired such velocity that it was boiling hot when it reached the bottom.*

The origin of the name of Alum Creek, a tributary of the Yellowstone, was due to an accidental discovery by Bridger. One day he forded the creek and rode out several miles and back. He noticed that the return journey was only a small fraction of the distance going, and that his horse's feet had shrunk to mere points which sank into the solid ground, so that the animal could scarcely hobble

* This story, which is taken from the report of Captain W. F. Raynolds, was one of Bridger's favorites, and it is even said that he did not regard it as pleasantry at all, but as plain matter of fact. Mr. Langford, who often heard him relate it, says that he generally described the stream as flowing over the smooth surface of a rock, and reasoned that, as two sticks rubbed together produce heat by friction, so the water rubbing over the rock became hot. In proof, he cited an instance where the water was hot only in close proximity to the rock and not at the surface. Mr. Langford found a partial confirmation of the fact, but not of the theory, in fording the Firehole River in 1870. He passed over the smooth deposit of an active hot spring in the bed of the stream, and found that the stream bottom and the water in contact with it were hot.

along. Seeking the cause he found it to be in the astringent quality of the water, which was saturated with alum to such an extent that it had power to pucker distance itself.*

To those who have visited the west shore of the Yellowstone Lake, and know how simple a matter it is to catch the lake trout and cook them in the boiling pools without taking them from the line, the groundwork of the following description will be obvious enough. Somewhere along the shore an immense boiling spring discharges its overflow directly into the lake. The specific gravity of the water is less than that of the lake, owing probably to the expansive action of heat, and it floats in a stratum three or four feet thick upon the cold water underneath. When Bridger was in need of fish it was to this place that he went. Through the hot upper stratum he let fall his bait to the subjacent habitable zone, and having hooked his victim, cooked him *on the way out!*

In like manner the visitor to the region of petrifications on Specimen Ridge in the northeast corner of the Park, and to various points in the hot springs districts, will have no difficulty in discovering the base material out of which Bridger contrived the following picturesque yarn. According to his account there exists in the Park country a mountain which was once cursed by a great medicine man of the Crow nation. Every thing upon the mountain at the time of this dire event became instantly petrified and has remained so ever since. All forms of life are standing about in stone where they were suddenly caught by the

* "The headwaters of this stream are so strong with alum that one swallow is sufficient to draw one's face into such shape that it is almost impossible to get it straightened out again for one hour or so."—Journal of C. J. Weikert, August 26, 1877.

petrifying influences, even as the inhabitants of ancient Pompeii were surprised by the ashes of Vesuvius. Sage brush, grass, prairie fowl, antelope, elk, and bears may there be seen as perfect as in actual life. Even flowers are blooming in colors of crystal, and birds soar with wings spread in motionless flight, while the air floats with music and perfumes siliceous, and the sun and the moon shine with petrified light!

To show how old this story is, we quote the following from "Life in the Far West," by George Frederick Ruxton (1849). It represents an old trapper who has come down from the mountains and is relating his experiences in a tavern in St. Louis. The colloquy is with the landlady. It is also of interest as one of the very few existing specimens of the dialect of the trapper in the days when he flourished in the region around the Yellowstone Park:

"'Well, Mister Harris, I hear you're a great traveler.'

"'Traveler, marm,' says Black Harris, 'this niggur's no traveler; I ar' a trapper, marm, a mountain-man, wagh!'

"'Well, Mister Harris, trappers are great travelers, and you goes over a sight of ground in your perishinations, I'll be bound to say.'

"'A sight, marm, this coon's gone over, if that's the way your "stick floats."* I've trapped beaver on Platte and Arkansa, and away up on Missouri and Yaller Stone; I've trapped on Columbia, on Lewis Fork, and Green River and the Heely (Gila). I've fout the "Blackfoot" (and d—d bad injuns they ar); I've "raised the hair" † of more than one Apach, and made a Rapaho "come" afore now; I've

* Meaning: "If that's what you mean." The "stick" is tied to the beaver trap by a string; and, floating on the water, points out its position, should a beaver have carried it away.

* Scalped.

trapped in Heav'n, in airth, and h—l; and scalp my old head, marm, but I've seen a putrefied forest.'

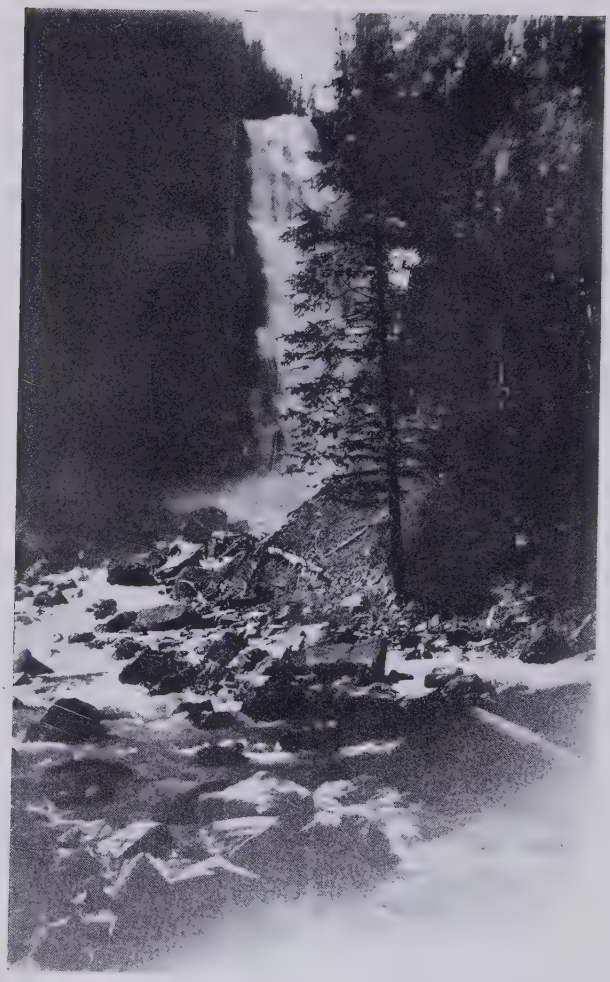
"'La, Mister Harris; a what?'

"'A putrefied forest, marm, as sure as my rifle's got hindsights, and "she" shoots center. It was out on the Black Hills, Bill Sublette knows the time—the year it rained fire—and everybody knows when that was. If thar wasn't cold doins about that time, this child wouldn't say so. The snow was about fifty foot deep, and the bufler lay dead on the ground like bees after a beein'; not whar we was tho', for thar was no bufler, and no meat, and me and my band had been livin' on our moccasins (leastwise the parflesh*) for six weeks; and poor doins that feedin' is, marm, as you'll never know. One day we crossed a "cañon" and over a "divide," and got into a peraira, whar was green grass, and green trees, and green leaves on the trees, and birds singing in the green leaves, and this in Febrary, wagh! Our animals was like to die when they see the green grass, and we all sung out, "hurrraw for summer doins."'

"'Hyar goes for meat,' says I, and I jest ups old Ginger [his rifle] at one of them singing birds, and down comes the crittur elegant; its darned head spinning away from the body, but never stops singing, and when I takes up the meat, I find it stone, wagh! "Hyar's damp powder and no fire to dry it," I says, quite skeared.'

"'Fire be dogged,' says old Rube. 'Hyar's a hos as'll make fire come;' and with that he takes his axe and lets drive at a cottonwood. Schru-k—goes the axe agin the tree, and out comes a bit of the blade as big as my hand. We looks at the animals, and thar they stood shaking over

* Soles made of buffalo hide.



Osprey Falls, Middle Gardiner River.

the grass, which I'm dog-gone if it wasn't stone too. Young Sublette comes up, and he'd been clerking down to the fort on Platte, so he know'd something. He looks and looks, and scrapes the trees with his butcher knife, and snaps the grass like pipe stems, and breaks the leaves a snapping like Californy shells.'

"'What's all this, boy?' I asks.

"'Putrefactions,' looking smart; 'putrefactions, or I'm a niggur.'

"'La, Mister Harris,' says the lady, 'putrefactions! Why, did the leaves, and the trees, and the grass smell badly?'

"'Smell badly, marm!' says Black Harris; 'would a thing smell if it was froze to stone? No, marm; this child didn't know what putrefactions was, and young Sublette's varsion wouldn't "shine" nohow, so I chips a piece out of a tree and puts it in my trap-sack, and carries it safe to Laramie. Well, old Captain Stewart (a clever man was that, though he was an Englishman), he comes along next spring, and a Dutch doctor chap was along too. I shows him the piece I chipped out of the tree and he called it a putrefaction, too; and so, marm, if that wasn't a putrefied peraira, what was it? For this hos doesn't know, and he knows "fat cow" from "poor bull," anyhow.'"

BIOGRAPHICAL NOTE.

James Bridger was born in Richmond, Va., in March, 1804, and died in Washington, Jackson Co., Mo., July 17, 1881. He must have gone west at a very early age, for he is known to have been in the mountains in 1824. *Niles Register* for 1822 speaks of him as associated with Fitzpatrick in the Rocky Mountain Fur Company. Another record of this period reveals him as leader of a band of

whites sent to retake stolen horses from the hostile Bannocks. In 1830 he had become a resident partner in the Rocky Mountain Fur Company. That he was a recognized leader among the early mountaineers while yet in his minority seems beyond question. He became "The Old Man of the Mountains" before he was thirty years of age.

Among the more prominent achievements of Bridger's life may be noted the following: He was long a leading spirit in the Rocky Mountain Fur Company. He discovered Great Salt Lake and the noted Pass that bears his name. He built Fort Bridger in the lovely valley of Black Fork of Green River, where transpired many thrilling events connected with the history of the Mormons and "Forty-niners." He had explored, and could accurately describe, the wonders of the Yellowstone fully a quarter of a century before their final discovery.

In person he was tall and spare, straight and agile, eyes gray, hair brown and long, and abundant even in old age; expression mild, and manners agreeable. He was hospitable and generous, and was always trusted and respected. He possessed to a high degree the confidence of the Indians, one of whom, a Shoshone woman, he made his wife.

Unquestionably Bridger's chief claim to remembrance by posterity rests upon the extraordinary part he bore in the exploration of the West. The common verdict of his many employers, from Robert Campbell down to Captain Raynolds, is that as a guide he was without an equal. He was a born topographer. The whole West was mapped out in his mind as in an exhaustive atlas. Such was his instinctive sense of locality and direction that it used to be said that he could "smell his way" where he could not see it. He was not only a good topographer in the field, but he could reproduce his impressions in sketches. "With a

buffalo skin and a piece of charcoal," says Captain Gunnison, "he will map out any portion of this immense region, and delineate mountains, streams, and the circular valleys, called 'holes,' with wonderful accuracy." His ability in this line caused him always to be in demand as a guide to exploring parties, and his name is connected with many prominent government and private expeditions.

His lifetime measures that period of our history during which the West was changed from a trackless wilderness to a settled and civilized country. He was among the first who went to the mountains, and he lived to see all that had made a life like his possible swept away forever.

CHAPTER VII.

RAYNOLDS' EXPEDITION.

On the 13th of April, 1859, Captain W. F. Raynolds, of the Corps of Topographical Engineers, U. S. A., was ordered to explore "the region of country through which flow the principal tributaries of the Yellowstone River, and the mountains in which they, and the Gallatin and Madison Forks of the Missouri, have their source." This was the first government expedition* directed to the precise locality which is now embraced in the Yellowstone National Park. It is interesting to us, not for what it accomplished—for it fortunately failed to penetrate the Upper Yellowstone country—but because it gives an admirable *resume,* in the form of a report and a map, of the geographical knowledge of that country down to the date of actual discovery.

Captain Raynolds was in the field during the two seasons of 1859 and 1860; but it was only in the summer of 1860 that he directed his efforts toward the country in which we are particularly interested. In May of that year the expedition left its winter quarters at Deer Creek, Wyo., and marched to the junction of the Wind River and the Popo Agie where these streams unite under the name of Big Horn River. Here the party divided. One division under Captain Raynolds was to ascend the Wind River to its source and then cross to the head waters of the Yellowstone.

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* Accompanying this expedition as geologist was Dr. F. V. Hayden, whose name is so intimately connected with the history of the Yellowstone Park. James Bridger was guide to the party.

This stream they were to follow down to the Great Bend, and then cross over to the Three Forks of the Missouri. The other party, under Lieutenant Maynadier, was to skirt the east and north flanks of the Absaroka Range and to join the first party at the Three Forks, if possible, not later than July 1st.

Captain Raynolds was charged with other instructions than those mentioned in his order, which must be kept in mind in order properly to account for the final outcome of the expedition. A total eclipse of the sun was to occur on July 18th of that year, and its line of greatest occultation lay north of the British boundary. It was desired that Captain Raynolds should be present in that locality in time to observe the eclipse. This condition, rather than impassable mountains or unmelted snows, was the chief obstacle to a thorough exploration of the Upper Yellowstone.

The two parties separated May 24th. Captain Raynolds, according to his programme, kept up the Wind River valley, and with much difficulty effected a crossing by way of Union Pass—which he named—to the western slope of the mountains. He then turned north seeking a passage to the head waters of the Yellowstone. When nearly opposite Two-Ocean Pass, he made a strenuous effort to force his way through, spending two days in the attempt. But it was still June and the snow lay deep on the mountains. It was a physical impossibility to get through at that point, and the risk of missing the eclipse forbade efforts elsewhere. The Captain was deeply disappointed at this result. He writes:

"My fondly cherished schemes of this nature were all dissipated by the prospect before us; . . . and I therefore very reluctantly decided to abandon the plan to which I had so steadily clung."

Lieutenant Maynadier wisely made no attempt to cross the Absaroka Range, which rose continuously on his left. Had he done so, the deep snow at that season would have rendered his efforts futile. He kept close to the flank of the mountains until he reached the valley of the Yellowstone north of the Park, and then hastened to join his commanding officer at the appointed rendezvous. He reached the Three Forks on the 3d day of July.

The expedition had now completely encircled the region of the Upper Yellowstone. At one point Captain Raynolds had stood where his eye could range over all that country which has since become so famous; but this was the limit of his endeavor. The Yellowstone wonderland was spared the misfortune of being discovered at so early a day—a fact quite as fortunate as any other in its history.

It will be interesting now to survey this region as known at the time of the Raynolds Expedition. Nothing of importance occurred to increase public knowledge of it until 1870, and Captain Raynolds' Report is therefore the latest authentic utterance concerning it prior to the date of actual discovery. In this report Captain Raynolds says:

"Beyond these [the mountains southeast of the Park] is the valley of the Upper Yellowstone, which is as yet a *terra incognita.* My expedition passed entirely around, but could not penetrate it. . . . Although it was June, the immense body of snow baffled all our exertions, and we were compelled to content ourselves with listening to marvelous tales of burning plains, immense lakes, and boiling springs, without being able to verify these wonders. I know of but two men who claim to have ever visited this part of the Yellowstone Valley—James Bridger and Robert Meldrum. The narratives of both these men are very remarkable, and Bridger, in one of his recitals, describes

an immense boiling spring, that is a perfect counterpart of the geysers of Iceland. As he is uneducated, and had probably never heard of the existence of such natural wonders elsewhere, I have little doubt that he spoke of that which he had actually seen. . . . Bridger also insisted that immediately west* of the point at which we made our final effort to penetrate this singular valley, there is a stream of considerable size, which divides and flows down either side of the water-shed, thus discharging its waters into both the Atlantic and Pacific Oceans."

The Captain concludes this particular part of his report as follows:

"I can not doubt, therefore, that at no very distant day, the mysteries of this region will be fully revealed; and, although small in extent, I regard the valley of the Upper Yellowstone as the most interesting unexplored district in our widely expanded country."

Lieutenant Maynadier also contributes a few interesting observations upon this region. The vast importance of that extensive mass of mountains, as a reservoir of waters for the country round about, impressed him deeply. He says, somewhat ostentatiously:

"As my fancy warmed with the wealth of desolation before me, I found something to admire in the calm self-denial with which this region, content with barren magnificence, gives up its water and soil to more favorable countries."

Of the Yellowstone River he was told that it had its source "in a lake in the impenetrable fastnesses of the Rocky Mountains;" and that for some distance below the lake it flowed through a narrow gorge, up which "no one has ever been able to travel."

* Actually northeast.

But it is the map prepared by Captain Raynolds that tells a more interesting story even than his written report. It reveals at once to the eye what was known as well as what was unknown of the Upper Yellowstone. Extending in a southeasterly and northwesterly direction, is a large elliptical space, within which geographical features are represented by dotted lines, indicating that they are put in by hearsay only. In the midst of a surrounding country, which is already mapped with great accuracy, there is a region wholly unknown to the geographer. A cordon of mountains encircles it, and shows the limit of official effort to gain a correct knowledge of it. Within this enchanted inclosure lies the region approximately defined by the 44th and 45th parallels of latitude and the 110th and 111th meridians of longitude, which now constitutes the Yellowstone National Park. There one may catch glimpses, through the uncertain haze of tradition, of the geysers, hot springs, Lake, Falls, Grand Cañon, Mammoth Hot Springs, and Two-Ocean Pass. This was the net result of fifty years' desultory wandering in and about and over this "mystic" region.

Raynolds' report was the first official recognition in any form of the probable existence of extensive volcanic phenomena in the region of the Upper Yellowstone. Had it been published immediately after the expedition, and had not public attention been totally engrossed with other matters of overshadowing importance, this region must have become fully known in the early Sixties. But within a month after the return of Captain Raynolds to civilization there had taken place the national election which was the signal for attempted armed disruption of the Union. A year later found every officer of the Army called to new fields of duty. Western exploration entirely ceased until

Lower Falls of the Yellowstone—Original Sketch by Private Moore, a Soldier in the Escort of the Expedition of 1870.

1865, and was not vigorously resumed for some years thereafter. Captain Raynolds' report did not appear until 1868, although his map was published several years earlier in order to meet a demand for it by the new settlers in Western Montana. Nothing transpired in the meantime to make the general public familiar with this region, and the picture here given is therefore substantially correct down to the date of the celebrated Washburn expedition.

CHAPTER VIII.

GOLD IN MONTANA.

Among the most fascinating pages of American history are those which recount the annals of the discoveries of gold and silver. No one can appreciate the magnitude of those various movements by a simple perusal of statistics of the mineral wealth which they disclosed. He must pass through the mining belts and note how almost every rod of ground, over vast tracts of country, is filled with prospect holes that attest the miner's former presence. If the trapper carried the tools of his trade to haunts remote and inaccessible, the miner, with his pick and shovel, certainly outdid him. One can readily understand that, as soon as such a movement should be directed toward the region of the Upper Yellowstone, the wonders of that region would speedily be revealed.

The presence of gold in the mountains of Montana was first noticed as far back as 1852. Later, in 1858, the Stuart brothers, James and Granville, founders of Montana, discovered gold in the Deer Lodge Valley; but they were destitute of equipments, and so constantly exposed to the hostility of the Blackfeet, that they went to Fort Bridger in the southwest corner of Wyoming, and did not return until late in 1860.

It was in 1860 and 1861 that the rich mines on the Salmon and Boise Rivers were discovered. In 1862 the tide of discovery swept across the mountains into Montana. The rich mines on Pioneer Creek, the Big Prickly Pear, the Big Hole River, North Boulder Creek, and at Bannock, and

other points, became known. Although there were scarcely a thousand people in Montana in the winter of 1862-3, the news of the great discoveries marshaled a host of immigrants ready to enter the territory in the following spring. These were largely re-enforced by adventurers from both the Northern and Southern States, who sought in these remote regions exemption from the tributes and levies of war. The immigrants were welcomed in the spring of 1863 by the news of the discovery of Alder Gulch, the richest of all gold placers. The work of prospecting, already being pushed with vigor, was stimulated to an extraordinary degree by this magnificent discovery. Prospecting parties scoured the country in all directions, often with loss of life through the Indians, but rarely, after the first two or three years, with any substantial success. Some of these expeditions have a particular connection with our narrative because they passed across portions of what is now the Yellowstone Park.

The most important of them occurred in August and September, 1863. It was led by Walter W. DeLacy, an engineer and surveyor of some distinction in the early history of Montana. The party at one time numbered forty-two men, although this number did not continue constant throughout the expedition. Its sole object was to "prospect" the country. Evidently nothing in the line of topographical reconnaissance was thought of, for Captain DeLacy says "there was not a telescope, and hardly a watch, in the whole party."

The expedition left Virginia City, August 3d; passed south into Idaho until it struck the Snake River, and then ascended that stream to the region about Jackson Lake. Near the mouth of Buffalo Fork a halt was made, a corral was built to hold the stock, and a miners' meeting held, at

which rules were adopted to govern the miners in the contemplated examination of the country. The party then broke up into small groups and set out in different directions so as to cover as much ground as possible. The last four days of August were spent in this search, but with failure in every direction. This discouragement led to the abandonment of the expedition. Fifteen men set out for home by the way they had come, while DeLacy and twenty-seven men resolved to reach the Madison River and the settlements by going north. A day later this party entered the territory which is now the Yellowstone Park.

The route lay up the Snake River to its junction with Lewis River, where the hot springs of that locality were discovered. Here another separation occurred. About half the party went back down the river to re-examine a locality where they thought they had found some fair prospects. They soon returned, however, unsuccessful. The main party under DeLacy ascended the hills to the west of the river to seek a more practicable route. They soon reached the summit of the plateau where they discovered what are now Hering and Beula Lakes, and noted their divergent drainage. Thence they passed north over Pitchstone Plateau until they struck the valley of Moose Creek. They descended this stream for a few miles and came to a large lake, which they supposed to be tributary to either the Madison or the Yellowstone Rivers. To their great surprise they found, upon rounding its southern point, that it drained *south* into the Snake. This is what is now called Shoshone Lake.

From the outlet of the lake, DeLacy sent a man down stream to examine the river. This reconnaissance resulted in the discovery of Lewis Lake and the hot springs basin there. When DeLacy resumed his route, he followed along

Snow in the Park Forests, June 13, 1899.

the east shore of the lake to its northern extremity, and then ascended the beautiful open valley of DeLacy Creek. He crossed the Continental Divide at the head of the valley, and camped on the evening of September 8th some miles beyond the Divide toward the Firehole River. The next morning, September 9, 1863, he came upon the considerable stream of hot water which flows down a mountain ravine into the Lower Geyser Basin close by the Great Fountain Geyser. The reader will learn with some amazement that the party thought little enough of this wonderful locality to pass directly through it without halt or perceptible delay. Before the camping hour of the afternoon had arrived, they were many miles away at the junction of the Gibbon and Firehole Rivers.

The other section of the party, which had gone down the Snake from its junction with Lewis River, soon returned, followed up the river to Lewis and Shoshone Lakes, passed around the western end of the latter lake, discovering its extensive geyser basin, and thence crossed over to the Madison. This stream they descended through the geyser basins, and followed the main party to the settlements.

DeLacy might have passed into history as the real discoverer of the Yellowstone wonderland, but for the fact that he failed to appreciate the true importance of what he saw. In that, however, he was no exception to the general rule of immigrants. The search for gold with them so far overshadowed all other matters, that it would have required something more than geysers to divert them, even momentarily, from its prosecution. Although DeLacy kept a daily journal of his expedition, and noted therein the various items of interest along his route, he did not publish it until 1876, long after public interest had been strongly attracted to the geyser regions. He did, however,

publish a map of the country through which he passed, and on this map he correctly noted the drainage of Shoshone Lake—something which the Folsom, Washburn and Hayden expeditions all failed to do. He also noted the various hot springs localities through which the party passed. In a letter published in Raymond's "Mineral Resources of the States and Territories West of the Rocky Mountains," in 1869, before the date of the Washburn expedition, he called attention to the existence of geysers at the head of Shoshone Lake and on the Madison River.

DeLacy's account, as finally published, is an interesting early view of this region, and is remarkable for its general correctness. That he failed to publish his discoveries must be regarded as fortunate, so far as the Park is concerned, for the time had not yet come when it was desirable that the real character of this country should be made known.

From 1863 to 1869 there were many other prospecting parties in the region of the Upper Yellowstone. In 1863 one of these parties, numbering thirty or forty men, ascended the Yellowstone and the East Fork to the mouth of Soda Butte Creek, and thence across an intervening ridge to the next northern tributary of the East Fork. Here all their horses were stolen by Indians. There were left only one or two mules, on which was packed all the baggage they could carry, the rest being concealed in a cache. The party then separated into two portions, and prospected the country for several days in the vicinity of Clark's Fork. They finally returned, emptied the cache, and descended to the Yellowstone, where they found fair prospects near the present north boundary of the Park. The expedition has no permanent interest for this narrative, except that it left the two geographical names, "Cache Creek" and "Bear Gulch."

In 1864, a party of seventy-three men, under James Stuart, passed from Deer Lodge, Montana, to the Yellowstone Valley, and thence around the east base of the Absaroka range into the valley of the Shoshone river. The object of this expedition was to punish the Indians for outrages of the previous year, and also to prospect the country for gold. At the Shoshone Stuart was compelled to return home. The party then separated into groups that gradually worked their way back to the Montana settlements. One of these small parties went as far south as the Sweetwater River, then crossed to the Green and Snake Rivers, and recrossed the Continental Divide at Two-Ocean Pass. They descended the Yellowstone, past the Lake and Grand Cañon, and beyond the present limits of the Park. Norris found remnants of their camp debris seventeen years afterward.

In 1866, a party under one George Huston left Virginia City, Montana, and ascended the Madison River to the geyser basins. Thence they crossed to the Yellowstone at Mud Geyser, ascended the river to the lake, passed completely around the latter, discovering Heart Lake on their way, and then descended the Yellowstone by the Falls and Cañon, to Emigrant Gulch. Here they were interviewed by a newspaper reporter, and on account of their travels was published in the *Omaha Herald.* They had seen about all there was to be seen in the whole region.

At least two parties traversed the Park country in 1867. One of these gave names to Crevice, Hell-roaring and Slough Creeks. An account of the wanderings of the other party appeared in the *Montana Post* of that year.

Many other parties and individuals passed through this region during the Montana mining craze. Their accounts appeared now and then in the local papers, and were re-

printed throughout the country. By 1869, probably very few of the reading public had not heard rumors of a strange volcanic region in the Far West. In Montana, particularly, repeated confirmation of the old trappers' tales was gradually arousing a deep interest, and the time was fast approaching when explorations for the specific purpose of verifying these rumors were to begin.

CHAPTER IX.

DISCOVERY.

The discovery of the Yellowstone Wonderland—by which is here meant its full and final disclosure to the world—was the work of three parties who visited and explored it in the years 1869, 1870, and 1871, respectively. The first of these expeditions was purely a private enterprise. It consisted of three men, and was the first party to enter this country with the express purpose of verifying or refuting the floating rumors concerning it. The second expedition was of a mixed character, having semi-official sanction, but being organized and recruited by private individuals. This was the famous "Yellowstone Expedition of 1870"—the great starting point in the post-traditional history of the Park. The third expedition was strictly official, under the military and scientific departments of the government. It was a direct result of the explorations of 1870, and was intended to satisfy the public demand for accurate and official information concerning this new region of wonders. It was the final and necessary step in order that the government might act intelligently and promptly for the preservation of what was believed to be the most interesting collection of wonders to be found in the world.

THE EXPEDITION OF 1869.

The question of setting definitely at rest the constantly multiplying rumors of wonderful volcanic phenomena

around the sources of the Yellowstone, began to be seriously agitated among the people of Montana as early as 1867. An expedition was planned for that year, but came to nothing. A like result attended a similar effort the following year. In 1869, the proposition came near materializing, but fell through at the last moment, owing to the failure to obtain a military escort. There were three members of this proposed expedition, however, who refused to be frightened off by any dangers which the situation at that time promised. They had already provided themselves with an elaborate equipment, and were determined, with escort or without it, to undertake the trip. The names of these men were David E. Folsom, C. W. Cook, and William Peterson, the last named being a native of Denmark. Armed with "repeating rifles, Colt's six-shooters, and sheath-knives," with a "double-barreled shot gun for small game;" and equipped with a "good field-glass, pocket compass and thermometer," and utensils and provisions "for a six weeks' trip," they set out from Diamond City on the Missouri River, forty miles from Helena, September 6, 1869.

The route lay up the Missouri to the Three Forks; thence *via* Bozeman and Fort Ellis to the Yellowstone River; and thence up the Yellowstone to its junction with the East Fork inside the present limits of the Park. From this point they crossed to the east bank and followed up the river, passing through the many groups of hot springs to be found east of the Grand Cañon. On September 21st, they arrived at the Falls of the Yellowstone, where they remained an entire day. Some distance above the rapids they re-crossed to the west shore and then ascended the river past Sulphur Mountain and Mud Volcano to Yellowstone Lake. They then went to the extreme west shore

of the lake and spent some time examining the surpassingly beautiful springs at that point. Thence they crossed the mountains to Shoshone Lake, which they took to be the head of the Madison, and from that point struck out to the northwest over a toilsome country until they reached the Lower Geyser Basin near Nez Percé Creek. Here they saw the Fountain Geyser in action and the many other phenomena in that locality. They ascended the Firehole River to Excelsior Geyser and Prismatic Lake, and then turned down the river on their way home. They were absent on the expedition thirty-six days.

It is said that these explorers were so astonished at the marvels they had seen that "they were, on their return, unwilling to risk their reputations for veracity by a full recital of them to a small company whom their friends had assembled to hear the account of their explorations." But Mr. Folsom later prepared a most entertaining narrative of his journey which was published in the *Western Monthly,* of Chicago, in July, 1871.* It deserves high rank in the literature of the Park. It is free from exaggeration and contains some descriptions unsurpassed by any subsequent writer. The article, and personal interviews with the author and his companions, had a strong

* It is only through the undiminished loyalty of Mr. N. P. Langford to every thing pertaining to the welfare of the Yellowstone National Park that this article has been saved from oblivion. The office of the *Western Monthly* was destroyed by the great Chicago fire of 1871, and all the files of the magazine were lost. Mr. Folsom had lost or given away all copies in his possession. So far as is known there is but one remaining copy of this issue, and that is owned by Mr. Langford. In 1894, Mr. Langford caused the article to be reprinted in handsome pamphlet form, with an interesting preface by himself.

influence in leading to the important expedition next to be described.

THE EXPEDITION OF 1870.

The Yellowstone Expedition of 1870, more commonly known as the Washburn-Doane Expedition, was the culmination of the project of discovery to which frequent reference has already been made. At this time the subject was exciting a profound interest throughout Montana, and the leading citizens of the territory were active in organizing a grand expedition. General Sheridan, who passed through Helena just prior to his departure for the scene of the Franco-German War, spent some time in arranging for a military escort to accompany the party. The project did not assume definite shape until about the middle of August, and when the time for departure arrived, Indian alarms caused a majority of the party to repent their decision to join it. Finally, there were only nine persons who were willing to brave all dangers for the success of the undertaking. These nine were:

General Henry D. Washburn, Surveyor-General of Montana, chief of the expedition, and author of a series of valuable "notes" describing it.

Hon. Nathaniel P. Langford, who published a series of articles in *Scribner's Magazine,* which gave general publicity to the news of discovery. He became first Superintendent of the Park.

Hon. Cornelius Hedges, who first proposed setting apart this region as a National Park.

Hon. Truman C. Everts, ex-U. S. Assessor for Montana, whose experience upon the expedition forms the most painful and thrilling chapter in the annals of the Yellowstone.

Hon. Samuel T. Hauser, President of the First National Bank of Helena, and later Governor of Montana.

Walter Trumbull, son of the late Senator Trumbull. He published an account of the expedition in the *Overland Monthly* for June, 1871.

Other civilian members of the expedition were Benjamin Stickney, Jr., Warren C. Gillette and Jacob Smith.

The personnel of this party is sufficient evidence of the widespread interest which was being taken at the time in the region of the Upper Yellowstone.

The party proceeded from Helena to Fort Ellis, one hundred and twenty-five miles, where they were to receive a military escort promised by General Hancock, at that time commanding the department in which Fort Ellis was located. The post order detailing this escort is dated August 21, 1870, and directs Lieutenant Gustavus C. Doane, Second Cavalry, with one sergeant and four privates, "to escort the Surveyor-General of Montana to the falls and lakes of the Yellowstone and return." There is a significant absence in this order of any reference to geysers or hot springs; and the discreet post commander evidently did not intend to commit himself to a recognition of their existence on the strength of such knowledge as was then available. His incredulity was, indeed, largely shared by the members of the party themselves. Mr. Hedges subsequently said:

"I think a more confirmed set of skeptics never went out into the wilderness than those who composed our party, and never was a party more completely surprised and captivated with the wonders of nature."

Lieutenant Doane, than whom no member of the expedition holds a more honorable place in its history, has left on record a similar confession.

The party as finally organized, including two packers and two colored cooks, numbered nineteen individuals. Thirty-five horses and mules, thoroughly equipped for a month's absence, completed the "outfit," and made altogether quite an imposing cavalcade.

August 22, 1870, the expedition left Fort Ellis, crossed to the Yellowstone, and ascended that stream through the First and Second Cañons, past the "Devil's Slide" and Cinnabar Mountain, to the present north boundary line of the Park at the mouth of the Gardiner River. At this point they were within five miles of the celebrated Mammoth Hot Springs which are now the first attraction to meet the tourist's eye on entering the Park. But the party kept close to the Yellowstone, instead of taking the modern route up the Gardiner, and missed this wonder altogether.

It was August 26th when the expedition entered the present territory of the Park. Lieutenant Doane and Mr. Everts, with one soldier and two hunters picked up on the way, rode in advance along the brink of the Third Cañon and across the high plateau between the Gardiner and Tower Creek, camping at nightfall upon the latter stream. In the broad open valley near the junction of the Yellowstone and East Fork, a small tepid sulphur spring gave them the first evidence of their approach to the regions of volcanic activity.

Next day, the remainder of the party arrived. Two days were spent in examining the beautiful Tower Falls, and—to our tyros in geyser exploration—the wonderful hot spring formations to be seen at that point. Here they also had for the first time glimpses of the Grand Cañon of the Yellowstone.

The party left Tower Creek on the 29th of August, and

followed up the river over the east flank of Mount Washburn. As their progress lifted them rapidly above the surrounding country, a marvelously beautiful landscape unfolded itself to their view. Presently an interesting incident occurred, which shall stand here in Lieutenant Doane's own language:

"Through the mountain gap formed by the cañon, and on the interior slopes some twenty [evidently a misprint] miles distant, an object now appeared which drew a simultaneous expression of wonder from every one of the party. A column of steam, rising from the dense woods to the height of several hundred feet, became distinctly visible. We had all heard fabulous stories of this region, and were somewhat skeptical of appearances. At first it was pronounced a fire in the woods, but presently some one noticed that the vapor rose in regular puffs, as if expelled with great force. Then conviction was forced upon us. It was, in deed, a great column of steam, puffing away on the lofty mountain side, escaping with a roaring sound audible at a long distance, even through the heavy forest. A hearty cheer rang out at this discovery, and we pressed onward with renewed enthusiasm."

The party then ascended the lofty mountain to their right, now known as Mt. Washburn, and from its summit looked around upon the vast panorama which is now included in the Yellowstone National Park. Had old James Bridger been present at that moment, he would have received ample vindication for long-standing injustice at the hands of his incredulous countrymen. *There* were the Cañon and Falls and Lake of the Yellowstone with evidence enough of boiling springs and geysers! The enthusiasm of the party was unbounded, and Lieutenant Doane

exultingly declares that they were "more than satisfied with the opening up of the campaign."

The pack-train continued its course along the side of the mountain, and went into camp after a march of only twelve miles. That evening Messrs. Washburn, Doane and Hedges went on ahead of the main party, discovering the extensive mud springs at the southern base of the mountain, and finally reached the verge of a cliff beyond which yawned the stupendous Cañon of the Yellowstone. It was the first real view from near by, but darkness prevented further examination.

The next day saw the arrival of the party at the Falls of the Yellowstone, close by the mouth of Cascade Creek, which, with its Crystal Falls, received that day their present names. The remainder of this day, August 30th, and the next, were spent in exploring the cañon and measuring the height of the falls. Messrs. Hauser and Stickney descended the sides of the cañon to the brink of the river about two miles below the falls; and Lieutenant Doane and Private McConnell accomplished the same difficult feat further down. It needs not to be said that the members of the party were profoundly impressed with the incomparable scenery of the Grand Cañon, although their descriptions of it are, perhaps, least satisfactory of any they have left us.

From the Cañon the party ascended the now placid river amid ever-changing wonders. They passed Sulphur Mountain and the uncanny region around the Mud Volcano and Mud Geyser, then crossed to the east shore of the river and finally went into camp, September 3d, on the shore of the Yellowstone Lake. Here our explorers were again in ecstacies, and not without cause; for, seen under favoring con-

ditions this "watery solitude" is one of the most beautiful objects in nature.

After a day spent in this camp, the expedition continued by slow stages up the east shore of the lake. Messrs. Doane and Langford scaled the lofty Absaroka Range just east of the lake, being the first white men known to have accomplished this feat, and their names now designate two of its noblest summits.

September 7th, the party forded the Upper Yellowstone and traversed the almost impassable labyrinths of fallen timber between the several projecting arms on the south of the lake. It was on this portion of the route, September 9th, that Mr. Everts became separated from his party, lost his horse with all his accouterments, and commenced those "thirty-seven days of peril," which so nearly cost him his life.* This unfortunate affair cast a deep gloom

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* The following succinct account of Everts' experience is from the pen of Lieutenant Doane, and is in the main correct. For Everts' own account see *Scribner's Monthly*, vol. III., p. 1.

"On the first day of his absence, he had left his horse standing unfastened, with all his arms and equipments strapped upon his saddle; the animal became frightened, ran away into the woods, and he was left without even a pocket knife as a means of defense. Being very near-sighted, and totally unused to traveling in a wild country without guides, he became completely bewildered. He wandered down to the Snake River Lake [Heart Lake], where he remained twelve days, sleeping near the hot springs to keep from freezing at night, and climbing to the summits each day in the endeavor to trace out his proper course. Here he subsisted on thistle-roots, boiled in the springs and was kept up a tree the greater part of one night by a California lion. After gathering and cooking a supply of thistle-roots, he managed to strike the south-west point of the [Yellowstone] Lake, and followed around the north side of the Yellowstone [River], finally

over the little party and seriously interfered with the progress of the expedition. A week was spent in searching for the lost companion, without other results than the discovery of the hot springs basins at Heart Lake and on the west shore of the Yellowstone Lake.

At length it was concluded that Mr. Everts had either been killed or had wandered back home; and it was resolved to wait no longer. The party were surfeited with sight-seeing, and believed that they had now covered the whole ground. They therefore determined to strike across

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reaching our [old] camp opposite the Grand Canon. He was twelve days out before he thought to kindle a fire by using the lenses of his field-glass, but afterward carried a burning brand with him in all his wanderings. Herds of game passed by him during the night, on many occasions when he was on the verge of starvation. In addition to a tolerable supply of thistle-roots, he had nothing for over thirty days but a handful of minnows and a couple of snow-birds. Twice he went five days without food, and three days without water, in that country which is a net-work of streams and springs. He was found on the verge of the great plateau, above the mouth of Gardiner's River. A heavy snow-storm had extinguished his fire; his supply of thistle-roots was exhausted; he was partially deranged, and perishing with cold. A large lion was killed near him, on the trail, which he said had followed him at a short distance for several days previously. It was a miraculous escape, considering the utter helplessness of the man, lost in a forest wilderness, and with the storms of winter at hand."

On the thirty-seventh day of his wanderings (September 9th to October 16th), he was discovered by Jack Baronett and George A. Pritchett, near the great trail on a high mountain a few miles west of Yancey's. Baronett threw up a mound of stones to mark the spot. He carried Everts in his arms the rest of that day, and passed the night on a small tributary of Black-tail Deer Creek. The next day he was taken on a saddle to near the mouth of the Gardiner.

the mountains to the Madison and follow that stream to the settlements. They set out on the morning of September 17th, over rugged hills and through fallen timber, crossing the Continental Divide twice, and camping that night in an open glade on a small branch of the Firehole. While passing the second time over the Divide, they caught a glimpse of Shoshone Lake and erroneously thought it to be the head of the Firehole River.

At 9 A. M., September 18th, the march was resumed. The party soon reached the Firehole just above Kepler Cascade and thence followed down the course of the stream. Tourists who have visited the Park since 1891, when the new road from the Upper Basin to the Lake was opened, will remember that immediately after leaving "Old Faithful" they plunge into an unbroken pine forest and see no other evidences of geyser action until they reach the Lake. The situation of our homeward-bound explorers can thus be easily understood. They were traveling toward the geysers. The dense forest concealed everything beyond the radius of a few hundred feet. In unsuspecting mood, bent only on getting home to tell their wonderful story, and perhaps to find their missing companion, they moved down the river, crossing considerably below the site of the present bridge above the Upper Basin, and suddenly emerged from the timber into an open treeless valley. It was nearly noon of a clear, cool September day. Directly in front of them, scarcely two hundred yards away, a vertical column of water and steam was shooting upward a hundred and fifty feet into the air. The bright sunlight turned the clear water into a mass of glittering crystals, and a gentle breeze wafted the vast white curtain of steam far to the right across the valley. Thus it was that "Old Faithful," as if forewarned of the approach of her distinguished visitors,

gave them her most graceful salutation; and thus she bowed out of the era of tradition and fable, and ushered the civilized world into the untrodden empire of the Fire King. Little wonder that our astonished explorers "spurred their jaded horses," and "gathered around the wonderful phenomenon."

The party spent only the remainder of the day and the following morning in the Upper Basin; but in that time saw seven of the principal geysers in action, and gave them their present names.* They then passed down the river through the Middle and Lower Basins, but stopped to examine only such curiosities as were close by the river. Their rations were nearly gone, their lost companion was not found, and the desire to tell what they had already seen was greater than the desire to see more. They therefore made haste for home, and on the evening of September 19th encamped where the Firehole and Gibbon Rivers unite to form the Madison. From this point the party journeyed steadily homeward, conversing on the expedition of the past month, and planning how their great discovery might best be brought to the attention of the world.

The news of this expedition created intense and widespread interest throughout the country. Messrs. Washburn, Hedges, Trumbull, and others, prepared numerous descriptive articles for the local Montana papers, many of them among the best that have ever been written upon the Park, and these were reproduced in every important paper in the land. The *Helena Herald,* of October 27, 1870, only a month after the return of the party, refers to the extraordinary interest aroused by these articles, so unlike the sixty years' indifference which had marked the history of this region.

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* See list of geysers in Appendix.

Forest Fire Near Upper Geyser Basin.

These preliminary and hasty reports were followed by more studied efforts. Lieutenant Doane's masterly report was completed December 15, 1870. Besides its intrinsic merit, it has the distinction of being the first official report upon the Upper Yellowstone country. It passed through the customary military channels and was finally sent to Congress, February 24, 1871. Prof. S. F. Baird, of the Smithsonian Institution, also presented the information gathered by Lieutenant Doane to the Philosophical Society of Washington during the winter.

Messrs. Langford and Trumbull prepared entertaining magazine articles, which, however, could not be gotten to press until the following May and June. But Mr. Langford in the meantime did effective work from the lecture stand. In Helena, Minneapolis, New York and Washington, he told the story of what he had seen. In Washington, the Hon. James G. Blaine, Speaker of the House, presided at the lecture, and in the audience was Dr. F. V. Hayden, who was destined to play a prominent part in the history of the Yellowstone Park.

From whatever point of view considered, this expedition is one of the most remarkable in our annals. From Helena to the farthest point reached by the party, the route passed over was nearly three hundred miles long. The region of the Upper Yellowstone is perhaps the most difficult of access in the entire country. Even to-day, it is an almost certain place in which to get lost, if one is not thoroughly familiar with wilderness travel and happens to stray away from the beaten path. In 1870, moreover, the danger from hostile Indians was a constant and formidable menace, and the party was more than once reminded of it during the progress of the expedition. But in spite of all these difficulties, the success of the enterprise was so complete, its incidents

were so full of romance, and its results were so far-reaching and important, that it well deserves the wide attention it has received.

THE JOINT GOVERNMENT EXPEDITION OF 1871.

The direct result of the expedition of 1870 was to cause the United States Geological Survey to change its programme for the season of 1871, so as to give attention to the new wonderland; and also to cause the military authorities to send a well-appointed engineer party to the same locality. These two expeditions, one under Dr. Hayden and the other under Captains Barlow and Heap, of the Engineer Corps of the Army, moved for the most part together, camping near each other, and accompanied by the same military escort. Particular attention will here be given only to such features of these expeditions as pertain to new discoveries.

At the very outset of their journey they branched off from the Washburn route at the mouth of the Gardiner River, and by ascending this stream, discovered the wonderful formations now known as the Mammoth Hot Springs. From this point, the parties traveled eastward to Tower Creek; thence over Mt. Washburn, and past the Cañon and Falls, to Sulphur Mountain, Mud Geyser, and the Lake; thence by a new route across the mountains to the Upper Basin; thence east across the mountains again, past Shoshone Lake to Yellowstone Lake; thence around the head of this body of water to its outlet; thence across the country, by separate routes, to the mouth of Soda Butte Creek; and thence down the East Fork to Baronett Bridge (which had been built only a few months before), and out of the Park by way of Mammoth Hot Springs.

The original work done by these parties, besides the

discovery of the springs on the Gardiner, was the opening of a route between the Yellowstone River and the Lower Geyser Basin; the exploration of the Lower Basin; the mapping of the shore line of Yellowstone Lake, by Dr. Hayden; the mapping of the head waters of the Snake River, by Captain Barlow; and some hasty explorations in the valley of the East Fork of the Yellowstone, now called Lamar River.

The chief value of these explorations, however, was not in the line of original discovery, but in the large collection of accurate data concerning the entire region. The photographs were of immense value. Description might exaggerate, but the camera told the truth; and in this case the truth was more remarkable than exaggeration. Unfortunately for Captain Barlow's collection, the great Chicago fire almost entirely destroyed it. The same cause delayed the appearance of his report until six weeks after the Park Bill was passed. An interesting and complete summary, however, appeared as a supplement in the *Chicago Journal* for January 13, 1872. The report and collection of photographs and specimens by Dr. Hayden were therefore the principal results of this season's work, and they played a decisive part in the events of the winter of 1871-2.

With the close of the expedition of 1871, the discovery of the Yellowstone wonderland was made complete. It remained to see what Congress would do with so unique and valuable a possession.

BIOGRAPHICAL NOTES.

Gustavus C. Doane.

Lieutenant Doane was born in Illinois, May 29, 1840, and died in Bozeman, Mont., May 5, 1892. At the age of

five he went with his parents, in wake of an ox team, to Oregon. In 1849 his family went to California at the outbreak of the gold excitement. He remained there ten years, in the meanwhile working his way through school. In 1862 he entered the Union service, went east with the California Hundred, and then joined a Massachusetts cavalry regiment. He was mustered out in 1865 as a First Lieutenant. He joined the Carpet-baggers and is said to have become Mayor of Yazoo City, Mississippi. He was appointed Second Lieutenant in the Regular Army in 1868, and continued in the service until his death, attaining the rank of Captain.

Doane's whole career was actuated by a love of adventure. He had at various times planned a voyage to the Polar regions, or an expedition of discovery into Africa. But fate assigned him a middle ground, and he became prominently connected with the discovery of the Upper Yellowstone country. His part in the Expedition of 1870 is second to none. He made the first official report upon the wonders of the Yellowstone, and his fine descriptions have never been surpassed by any subsequent writer. Although suffering intense physical torture during the greater portion of the trip, it did not extinguish in him the truly poetic ardor with which those strange phenomena seem to have inspired him. Dr. Hayden says of this report: "I venture to state, as my opinion, that for graphic description and thrilling interest it has not been surpassed by any official report made to our government since the times of Lewis and Clark."

Nathaniel Pitt Langford.

Mr. Langford was born August 9, 1832, in Westmoreland, Oneida County, New York. His early life was spent on his father's farm, and his education was obtained by

winter attendance at district school. At nineteen, he became clerk in the Oneida Bank of Utica. In 1854, he went to St. Paul, where we find him, in 1855, cashier of the banking house of Marshall & Co., and in 1858, cashier of the Bank of the State of Minnesota. In 1862, he went to Montana as second in command of the Northern Overland Expedition, consisting of 130 men and 53 wagons drawn by oxen. In 1864, he was made Collector of Internal Revenue for the new territory. In 1868, he was appointed by President Johnson Governor of Montana, but as this was after the Senate's imbroglio with the President and its refusal to confirm any more presidential appointments, he did not reach this office. He was one of the famous Montana Vigilantes, a member of the Yellowstone Expedition of 1870, and first Superintendent of the newly created Park. In 1872, he was appointed National Bank Examiner for the Pacific States and Territories, and held the office for thirteen years. He now resides in St. Paul, Minnesota. He is author of a series of articles in *Scribner's* for 1871, describing the newly-discovered wonders of the Yellowstone, and of the important work, "Vigilante Days and Ways," the most complete history in existence of that critical period in Montana history.

The notable part which Mr. Langford bore in the discovery of the Upper Yellowstone country, and in the creation of the Yellowstone National Park, has been fully set forth elsewhere. He has always been its ardent friend, and his enthusiasm upon the subject in the earlier days of its history drew upon him the mild raillery of his friends, who were wont to call him "National Park" Langford—a sobriquet to which the initials of his real name readily lent themselves.

Henry Dana Washburn.

General Washburn was born in Windsor, Vt., March 28, 1832. His parents moved to Ohio during his infancy. He received a common school education and at fourteen began teaching school. He entered Oberlin College, but did not complete his course. At eighteen he went to Indiana where he resumed school-teaching. At twenty-one he entered the New York State and National Law School, from which he graduated. At twenty-three he was elected auditor of Vermilion County, Indiana.

His war record was a highly honorable one. He entered the army as private in 1861 and left it as Brevet Brigadier-General in 1865. His service was mainly identified with the Eighteenth Indiana, of which he became Colonel. He was in several of the western campaigns, notably in that of Vicksburg, in which he bore a prominent part. In the last year of the war he was with Sherman's army, and for a short time after its close was in command of a military district in Southern Georgia. In 1864, he was elected to Congress over the Hon. Daniel W. Voorhees, and again, in 1866, over the Hon. Solomon W. Claypool. At the expiration of his second term he was appointed by President Grant, surveyor-general of Montana, which office he held until his death.

It was during his residence in Montana that the famous Yellowstone Expedition of 1870 took place. His part in that important work is perhaps the most notable feature of his career. As leader of the expedition he won the admiration and affection of its members. He was the first to send to Washington specimens from the geyser formations. He ardently espoused the project of setting apart this region as a public park, and was on his way to Washington in its interest when his career was cut short by

death. The hardship and exposure of the expedition had precipitated the catastrophe to which he had long been tending. He left Helena in November, 1870, and died of consumption at his home in Clinton, Indiana, January 26, 1871.

Ferdinand Vandiveer Hayden.

"Doctor Hayden was born at Westfield, Massachusetts, September 7, 1829. . . . . His father died when he was about ten years of age, and about two years later he went to live with an uncle at Rochester, in Lorain County, Ohio, where he remained for six years. He taught in the country district schools of the neighborhood during his sixteenth and seventeenth years, and at the age of eighteen went to Oberlin College, where he graduated in 1850. . . .

"He studied medicine with Dr. J. S. Newberry, at Cleveland, and at Albany was graduated Doctor of Medicine in the early part of 1853. After his graduation, he was sent by Prof. James Hall, of New York, to the Bad Lands of White River, in Dakota. The years 1854 and 1855 he spent exploring and collecting fossils in the Upper Missouri country, mainly at his own expense. From 1856 until 1859, he was connected as geologist with the expeditions of Lieutenant Warren; engaged in explorations in Nebraska and Dakota. From 1859 until 1862, he was surgeon, naturalist, and geologist with Captain W. F. Raynolds, in the exploration of the Yellowstone and Missouri Rivers. In October, 1862, he was appointed acting assistant surgeon and assistant medical inspector until June, 1865, when he resigned, and was brevetted Lieutenant-Colonel for meritorious services during the war. He then resumed his scientific work, and in 1866 made another trip to the Bad Lands of Dakota, this time in the interest of the Academy of Natural Sciences of Philadelphia. In 1865, he was

elected professor of mineralogy and geology in the University of Pennsylvania, which position he resigned in 1872. From 1867 to 1879, his history is that of the organization of which he had charge, which began as a geological survey of Nebraska, and became finally the Geological Survey of the Territories. . . . From 1879 until December, 1886, he was connected with the United States Geological Survey as geologist. His health began to fail soon after his connection with this organization, and gradually became worse, and he lived only a year after his resignation.

"In 1876, the degree of LL.D. was conferred upon him by the University of Rochester, and in June, 1886, he received the same degree from the University of Pennsylvania. He was a member of seventeen scientific societies in the United States, among them the National Academy of Sciences, and was honorary and corresponding member of some seventy foreign societies. A bibliography of his writing includes 158 titles.

". . . The diffidence, approaching even timidity, which impressed his fellow-students at Oberlin, characterized Dr. Hayden throughout his life, and rendered it somewhat difficult for those who did not know him intimately to understand the reasons for his success, which was undoubtedly due to his energy and perseverance, qualities which were equally characteristic of him as a boy and student and in later life. His desire to forward the cause of science was sincere and enthusiastic, and he was always ready to modify his views upon the presentation of evidence. He was intensely nervous, frequently impulsive, but ever generous, and his honesty and integrity were undoubted. The greater part of his work for the government and for science was a labor of love."*

* Bulletin Philosophical Society of Washington, Vol. VI., pp. 476-8.

CHAPTER X.

THE NATIONAL PARK IDEA—ITS ORIGIN AND REALIZATION.

Since the Park was created and has to such a marked degree received the approval of the people, numerous claimants have arisen for the honor of having first suggested the idea. In truth, no special credit for originality should attach to the matter. It was a natural, an unavoidable proposition. To those who first saw these wonders, and were so absorbed with gold-seeking as to be incapable of appreciating their importance, it was clear that, within a few years, they must become objects of universal interest. It was equally clear that the land around them would soon be taken up by private parties, and that the beautiful formations would be carried off for mercenary purposes; in short, that the early history of Niagara and of the Yosemite would repeat itself in the Yellowstone. To avoid such a calamity only one course was open, and that was for the government to retain control of the entire region. That the necessity of such a course should have been set forth independently by several different parties, as we find it to have been, is therefore not in the least surprising.

But inasmuch as the development of the project must have started from some one source, it is of interest historically to determine what this source was. We find it to have been the Washburn Expedition of 1870.* The subject

* Mr. Folsom deserves mention in this connection. In the manuscript of his article in the *Western Monthly* was a reference to the Park idea; but the publishers cut out a large part of his paper, giving only the descriptions of the natural won-

was discussed by the party at the first camp after leaving the geyser regions near the junction of the Firehole and Gibbon Rivers. The date was September 19, 1870. The members of the party were sitting around the camp-fire after supper, conversing about what they had seen, and picturing to themselves the important pleasure resort which so wonderful a region must soon become. The natural impulse to turn the fruits of discovery to the personal profit of the discoverer made its appearance, and it was suggested that it would be a "profitable speculation" to take up land around the various objects of interest. The conversation had not proceeded far on these lines when one of the party, Cornelius Hedges, interposed and said that private ownership of that region, or any part of it, ought never to be countenanced; but that it ought to be set apart by the government and forever held to the unrestricted use of the people. This higher view of the subject found immediate acceptance with the other members of the party. It was agreed that the project should be at once set afoot and pushed vigorously to a finish.

As soon as the party reached Helena, a series of articles appeared in the daily papers of that city describing the late expedition, and in one of them, written by Mr. Hedges and published in the *Helena Herald* November 9, 1870, occurs what is believed to be the first public reference to the Park project.

The next mention of the subject was in Mr. Langford's lecture, delivered, as already related, in Washington, January 19, 1871; in New York, January 21, 1871; and at a

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ders, and this reference was cut out with the rest. Mr. Folsom also suggested the idea to General Washburn, of which fact Mr. N. P. Langford is still a living witness. From Mr. Folsom's suggestion, however, no direct result can be traced.

later date in Minneapolis. At each of these places he closed his lecture with a reference to the importance of setting apart this region as a National Park. The *New York Tribune* of January 23, 1871, thus quotes Mr. Langford:

"This is probably the most remarkable region of natural attractions in the world; and, while we already have our Niagara and Yosemite, this new field of wonders should be at once withdrawn from occupancy, and set apart as a public National Park for the enjoyment of the American people for all time."

Such is the origin of the idea which has found realization in our present Yellowstone Park. The history of the Act of dedication, by which the Park was created, may be briefly told. The general plan for a vigorous prosecution of the project was arranged in Helena, Montana, mainly by Nathaniel P. Langford, Cornelius Hedges and William H. Clagett, who had just been elected delegate to Congress from Montana, and who had already himself independently urged the importance of converting this region into a public park. Mr. Langford went to Washington when Congress convened, and he and Mr. Clagett drew the Park Bill, except as to description of boundaries, which was furnished by Dr. Hayden. The bill was introduced in the House by Mr. Clagett, December 18, 1871. Senator Pomeroy, of Kansas, had expressed a desire to perform a like service in the Senate, and accordingly Mr. Clagett, as soon as he had presented the measure to the House, took a copy to the Senate Chamber and gave it to Senator Pomeroy, who immediately introduced it. In each House it was referred to the Committee on Public Lands. In the Senate no formal report was prepared. In the House the Hon. Mark H. Dunnell, of Minnesota, chairman of the sub-committee having the bill in charge, addressed a letter

under date of January 27, 1872, to the Secretary of the Interior, asking his opinion upon the proposed measure. The Secretary replied, under date of January 29th, fully indorsing the project, and submitting a brief report by Dr. Hayden, which forcibly presented all the main features of the case.

The bill, being thus before Congress, was put through mainly by the efforts of three men, Dr. F. V. Hayden, N. P. Langford and Delegate William H. Clagett. Dr. Hayden occupied a commanding position in this work, as representative of the government in the exploration of 1871. He was thoroughly familiar with the subject, and was equipped with an exhaustive collection of photographs and specimens gathered the previous summer. These were placed on exhibition, and were probably seen by all members of Congress. They did a work which no other agency could do, and doubtless convinced every one who saw them that the region where such wonders existed should be carefully preserved to the people forever. Dr. Hayden gave to the cause the energy of a genuine enthusiasm, and his work that winter will always hold a prominent place in the history of the Park.

Mr. Langford, as already stated, had publicly advocated the measure in the previous winter. He had rendered service of the utmost importance, through his publication in *Scribner's Magazine* in the preceding May and June. Four hundred copies of these magazines were brought and placed upon the desks of members of Congress on the days when the measure was to be brought to vote. During the entire winter Mr. Langford devoted much of his time to the promotion of this work.

The Hon. William H. Clagett, as delegate from the Territory most directly interested in the passage of the

bill, took an active personal part in its advocacy from beginning to end.

Through the efforts of these three gentlemen, and others less conspicuously identified with the work, this measure received perhaps the most thorough canvass of any bill that has ever passed Congress. All the members were personally visited and, with few exceptions, won to the cause. The result was a practical unanimity of opinion when the measure came to a vote. This first took place in the Senate, the bill being passed by that body January 30th. It was warmly supported upon its passage by several members and opposed by one, Senator Cole, of California; a fact the more remarkable because that Senator had in his own State —in the preemption by private parties of the Yosemite wonderland—the most convincing example possible of the wisdom of such a measure as that proposed.

The Senate bill came up from the Speaker's table in the House of Representatives, February 27th. Mr. Dunnell stated that the Committee on Public Lands had instructed him to ask the House to pass the Senate bill. Hon. H. L. Dawes, of Massachusetts, warmly advocated the measure, which was then passed by a decisive vote.* The bill received the President's signature March 1, 1872.†

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* No yea and nay vote was taken in the Senate. The vote in the House was—yeas, 115; nays, 65; not voting, 60.

†THE ACT OF DEDICATION.

AN ACT to set apart a certain tract of land lying near the headwaters of the Yellowstone River as a public park.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the tract of land in the Territories of Montana and Wyoming lying near the headwaters of the Yellowstone River and described as follows, to-wit: Commencing at the junction of Gardiner's River with the Yellowstone River and running east

Perhaps no act of our national Congress has received such general approbation at home or such profuse commendation from foreigners as that creating the Yellowstone National Park. The lapse of time only serves to confirm and extend its importance; and to give additional force to the sentiment so well expressed by the Earl of Dunraven when he visited the Park in 1874:

"All honor then to the United States for having bequeathed as a free gift to man the beauties and curiosities of 'Wonderland.' It was an act worthy of a great nation,

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to the meridian, passing ten miles to the eastward of the most eastern point of Yellowstone Lake; thence south along the said meridian to the parallel of latitude, passing ten miles south of the most southern point of Yellowstone Lake; thence west along said parallel to the meridian, passing fifteen miles west of the most western point of Madison Lake; thence north along said meridian to the latitude of the junction of the Yellowstone and Gardiner's Rivers; thence east to the place of beginning, is hereby reserved and withdrawn from settlement, occupancy, or sale under the laws of the United States, and dedicated and set apart as a public park or pleasuring ground for the benefit and enjoyment of the people; and all persons who shall locate, or settle upon, or occupy the same or any part thereof, except as hereinafter provided, shall be considered trespassers and removed therefrom.

SEC. 2. That said public park shall be under the exclusive control of the Secretary of the Interior, whose duty it shall be, as soon as practicable, to make and publish such rules and regulations as he may deem necessary or proper for the care and management of the same. Such regulations shall provide for the preservation from injury or spoliation of all timber, mineral deposits, natural curiosities or wonders within said park, and their retention in their natural condition.

The Secretary may, in his discretion, grant leases for building purposes, for terms not exceeding ten years, of small parcels of ground, at such places in said park as shall require the erection of buildings for the accommodation of visitors; all of

and she will have her reward in the praise of the present army of tourists, no less than in the thanks of the generations of them yet to come."*

It was a notable act, not only on account of the transcendent importance of the territory it was designed to protect, but because it was a marked innovation in the traditional policy of governments. From time immemorial privileged classes have been protected by law in the withdrawal, for the exclusive enjoyment, of immense tracts for forests, parks and game preserves. But never before was a region of such vast extent as the Yellowstone Park set apart for the use of all the people without distinction of rank or wealth.

The example thus set by the United States has been widely followed, We have now the Yosemite and Sequoia National Parks, and numerous parks upon the sites of great battlefields. The State of New York has a Niagara Park

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the proceeds of said leases, and all other revenue that may be derived from any source connected with said park, to be expended under his direction in the management of the same and the construction of roads and bridle-paths, and shall provide against the wanton destruction of the fish and game found within said park and against their capture or destruction for the purpose of merchandise or profit. He shall also cause all persons trespassing upon the same after the passage of this act to be removed therefrom, and generally shall be authorized to take all such measures as shall be necessary or proper to fully carry out the objects and purposes of this act

Approved March 1, 1872.

Signed by:

JAMES G. BLAINE, Speaker of the House.

SCHUYLER COLFAX, Vice President of the United States and President of the Senate.

ULYSSES S. GRANT, President of the United States.

* Page xi., "The Great Divide."

and contemplates setting apart a portion of the Adirondac region. Minnesota has the Itasca State Park, including the sources of the Mississippi. Canada also has a public park at Niagara, and a large reservation in the midst of the finest scenery of the Rocky Mountains. New Zealand has set apart for public use the region of her hot springs and geysers. Finally the question has been mooted of reserving a vast tract of Africa wherein the large game of that continent may be kept from annihilation.*

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* In the first edition of this work the author represented George Catlin, the well-known painter of Indian scenes and portraits, as having originated the Park idea. This was hardly a correct position. Catlin's idea of a National Park was solely as a home for the Indians—a "Nation's Park, containing man and beast in all the wildness and freshness of their nature's beauty." He was an enthusiast upon that subject, as the following reference to it will show: "I would ask no other monument to my memory, nor any other enrollment of my name among the famous dead, than the reputation of having been the founder of such an institution."

His scheme had no possible reference to the geyser regions, of which he most probably never heard, and his name can not be considered in connection with those who originated the idea of the Yellowstone Park.

CHAPTER XI.

WHY SO LONG UNKNOWN.

There is no more singular fact connected with the history of the Upper Yellowstone country than its long immunity from the presence of white men. From the date when Lewis and Clark first stood at the Three Forks of the Missouri, less than one hundred miles distant from this notable region, sixty-five years elapsed before it was fully known. In the meantime all the surrounding country had been thoroughly explored. Cities, villages, farms and highways had been established throughout the West. A railroad had been built across the continent. But around the head waters of the Yellowstone, the most attractive region of all, it was still *terra incognita.* A fact so remarkable requires explanation.

The most difficult feature of the question is the fact that little knowledge of this region appears ever to have been derived from the Indians. Lewis and Clark were told of the Great Falls of the Missouri, and of other notable geographical features, long before they saw them. But of the far more wonderful Falls of the Yellowstone, of the great lake in the mountains, or of the marvelous volcanic phenomena in the same neighborhood, they received no hint. There is not a single instance on record, so far as we can discover, except in the meager facts noted in an earlier chapter, where rumors of this strange country appear to have fallen from the lips of Indians. And yet it was not a region unknown to them, for they had certainly passed back and forth across it for a long period in the

past. Their deep silence concerning it is therefore no less remarkable than mysterious.

But how was it that the long period of the fur trade should have passed without disclosing this country? To this question a more satisfactory answer may be returned. The Upper Yellowstone country was indeed, as we have seen, frequently visited in these early years. But it was never favorite territory. Old trappers say that, although it abounded in beaver, they were not so plentiful as in lower altitudes, while on the streams impregnated with mineral matter, the furs were not so good. The seasons also were unpropitious. The winter snows were so deep—they came so early and remained so late—that little could be done there except from the middle of June to the middle of September. But furs taken during the summer months are of inferior quality, and there was consequently no inducement to trap. Moreover it was generally at this time that the gatherings at posts and rendezvous took place, and after these were over but little time remained. Causes like these prevented extensive operations in this region, and doubtless only a comparatively small number of trappers ever saw it.

Then, the interest of the trader was against the dissemination of any knowledge which might induce immigration and hasten the certain ruin of his occupation. The stress of competition also caused him to remain silent concerning the places he had seen, lest a rival should profit thereby. He took no pains to reveal the country, and the trappers were too illiterate to do so had they wished. With the few notable exceptions which have been mentioned in a previous chapter, no important press notice of these regions appeared during the entire sixty-five years.

The fur business itself quickly ran its course, and with

it disappeared all probability of an early discovery of the geyser regions from this cause. The war with Mexico followed, with the vast cession of territory which it secured. Then came the highly important discovery of gold in California. Already the Mormon emigration had taken place. These great events completely changed the character and purpose of western exploration. The whole West was forgotten excepting only California and the Salt Lake Valley, and the routes leading to them. None of these led close to the geyser regions. On the north were the British fur trader's route, and the Missouri River route, both of which led directly west to the Columbia. To the south was the great thoroughfare along the Platte River and through South Pass, leading to Utah, California and Oregon. Still further south were the long known routes near the border of Old Mexico. It was hopelessly improbable that gold seekers bound to the Pacific Coast along any of these routes would stray into the mountain fastnesses about the sources of the Yellowstone.

Finally the whole energy of the government in the field of exploration was directed away from this region. In the period from 1804-6, the date of Lewis and Clark's Expedition, to 1870, the date of the real discovery of the Park, there were no fewer than one hundred and ten explorations in the country west of the Mississippi, nearly all of which had government authority, and were conducted on a scientific basis. Of these eighty-four were in the territory lately acquired from Mexico, and mostly in the far South and West. Nineteen were east of the Bighorn Mountains, five north of the Yellowstone, and only two in the region about the Upper Yellowstone. Of these two expeditions one was that of Lewis and Clark, and was in no wise intended to explore the Upper Yellowstone further than might be

necessary to find a good route to the Pacific. This leaves but a single expedition of the whole number, that of Captain Raynolds, which was directed to this specific territory. How the purpose of this expedition was defeated by the heavy snow in the mountains and by the solar eclipse of 1860, has been elsewhere related.

And so it came about that it was the gold-seeker who finally revealed the well-kept secret of the Yellowstone. Itself destitute of mineral wealth, this region could not escape the ubiquitous prospector. It was not, indeed, by him that it was publicly proclaimed to the world. He cared little for any country that was destitute of "color" or "pay." But the hints he dropped put others on the track and opened the door to real discovery.

This fact of long delay in the discovery of the Upper Yellowstone is the most important in its history. Had it been known at an earlier date, its fate would have been deplorably different. The period of the fur trade was too early for the interest of the people to demand, or the power of the government to enforce, its protection. If Captain Raynolds had discovered it, all its most valuable tracts would have been pre-empted long before the government would have been able to give it attention. Fortunately, the discovery was delayed until there was a considerable population in the country near by, and the government was prepared actively to consider the matter. Before settlers could establish a permanent foothold, the Park was created, and all the vexatious obstacles, which might otherwise have defeated the project, were avoided.

Yellowstone River Near Tower Falls.

CHAPTER XII.

LATER EXPLORATIONS.

As soon as the remarkable character of the country about the sources of the Yellowstone became generally known, there was a rush of explorers to its borders. Every expedition that could possibly extend the field of its labors in that direction did so, and there was scarcely a summer during the next twenty years that the Park was not the scene of some official exploration or visit.

By far the most important of these were the various expeditions under the United States Geological Survey. Dr. Hayden was again in the country with two parties in 1872, and very widely extended the range of observations of the previous year. In 1878, survey parties again entered the Park and resumed work there on a much more minute and extensive scale. The result of that year's explorations appeared in 1883 in the form of an elaborate report by Dr. Hayden and his co-workers, which entered with much detail into the more important subjects of scientific interest. It was embellished with a great number of engravings and colored plates, and with an exhaustive series of topographical and geological maps. The work was again taken up in 1883, and was continued for several years. All questions of scientific importance were investigated more thoroughly than ever before, and many valuable official reports and monographs, together with a superb map, have been the result.

In 1872, General John Gibbon, U. S. A., with a considerable party, made a tour of the Park, passing by the usual

route from Mammoth Hot Springs *via* Mt. Washburn, the Grand Cañon, and the Lake, to the Firehole Geyser Basins. On his way home he attempted to ascend the North Fork of the Madison, following an old trail; but he abandoned the attempt after going a few miles. His name, which was given to the river, has also attached to many other features along that valley.

In 1873, Captain William A. Jones, of the Corps of Engineers, passed through the Park as part of a more extended reconnaissance. He was the first to carry a party through the "impassable barrier" of the Absaroka Range. Jones Creek, just east of the northern portion of the Yellowstone Lake, shows where the party entered the Park. From the Lake the expedition passed down the east bank of the river to the valley of Junction Butte; thence west to Mammoth Hot Springs; thence back over the usual trail *via* Tower Creek, Mt. Washburn, the Grand Cañon and Mud Geyser, to the Lower Geyser Basin; thence *via* the Upper Basin to the west shore of the Yellowstone Lake; thence to the Upper Yellowstone River; thence through Two-Ocean Pass and Two-Gwo-Tee Pass to the valley of Wind River. The chief results of this expedition, in the line of original discovery, were the passage of the Absaroka Range, the verification of the traditional "Two-Ocean Water," between Atlantic and Pacific Creeks, in Two-Ocean Pass, and the discovery of the extremely easy Pass (Two-Gwo-Tee*) over the Continental Divide, between the Snake and Wind Rivers. Prof. Theodore B. Comstock accompanied the expedition as geologist. A valuable report of the reconnaissance appeared in 1875.

In 1875, Captain William Ludlow, of the Corps of Engi-

* So named by Captain Jones for one of his Indian guides.

neers, made a reconnaissance from Carroll, Montana, on the Missouri River, to the Yellowstone Park and return. In the Park he followed the previously traveled routes and developed little in the line of original discovery. He succeeded, however, in obtaining a very accurate measurement of the height of the Yellowstone Falls, and his report forms one of the ablest brief descriptions of the Park extant. Among his civil assistants was George Bird Grinnell, later widely known as the editor of *Forest and Stream*, and as one of the most steadfast and watchful guardians the Park has ever had.

During the same season a distinguished party, consisting of the Secretary of War, Gen. W. W. Belknap, and several prominent officers and civilians, with Lieutenant G. C. Doane, of National Park fame, as guide, made a complete tour of the Park. An exceedingly interesting narrative of the trip was written by Gen. W. E. Strong, who was a member of the party.

In 1877, Gen. W. T. Sherman and staff made a tour of the Park. His letters on the subject to the Secretary of War, and the official report prepared by Gen. O. M. Poe of his staff, form a valuable contribution to the literature of the Park.

In the same year Gen. O. O. Howard crossed the reservation in pursuit of the Nez Percé Indians.

In 1880, the Hon. Carl Schurz, Secretary of the Interior, accompanied by Gen. Crook with a large number of officers and soldiers, and an immense pack train, entered the Park from the valley of Henry Fork and made an extended tour.

In 1881, Captain W. S. Stanton, of the Corps of Engineers, made a reconnaissance through the Park, entering by the way of Soda Butte Creek, and passing out by the

Madison Valley. The most important result of his work in the Park was a more accurate table of distances over some of the routes than had previously been in use.

In July and August of this year, the Hon. John W. Hoyt, Governor of Wyoming, with a military escort under command of Major Julius W. Mason, U. S. A., made an extended reconnaissance to discover a practicable wagon route to the Yellowstone Park from the southeast. He entered the Park by way of the Upper Yellowstone, passed through it by way of Yellowstone and Shoshone Lakes, the Firehole Geyser Basins, the Grand Cañon, the lower end of Yellowstone Lake, and left it along the route by which Captain Jones had entered in 1873.

In the years 1881 and 1882, General Sheridan, with parties of considerable size, twice crossed the Park and visited its most important points. His expeditions were of great value to the Park from the forcible warning which he gave to the public concerning the demoralized condition of its civil administration.

To these various expeditions must be added the extensive, though desultory, explorations of P. W. Norris during the five years that he was Superintendent of the Park.

It has thus come about that Yellowstone National Park, though remote, inaccessible, and of great extent, is about the most thoroughly explored section of the United States. Within the territory bounded by the 44th and 45th parallels of latitude, and the 110th and 111th meridians of longitude, there are nearly four hundred geographical names. The names of hot springs and geysers would probably double the number. To appreciate this fact, it must be remembered that there are no settlements in the Park, and that counties, townships, cities, and villages, which

on ordinary maps form so large a proportion of the names, are here entirely absent. That region has indeed been a paradise for the explorer, the topographer, and the geologist; and its splendid opportunities have not gone unimproved.

The most elaborate expedition that ever passed through this region took place in August, 1883.* It included among its members the President of the United States, the Secretary of War, the Lieutenant-General of the Army, a United States Senator, and several other distinguished officers and civilians. The interesting part of the journey lay between Fort Washakie, Wyoming, and the Northern Pacific Railroad at Cinnabar, Montana. The party traveled entirely on horseback, accompanied by one of the most complete pack trains ever organized in this or any other country, and escorted by a full troop of cavalry. Couriers were stationed every twenty miles with fresh relays, and by this means, communication was daily had with the outside world. The whole distance traveled was 350 miles, through some of the wildest, most rugged, and least settled portions of the west. No accident or drawback occurred to mar the pleasure of the expedition. The

* The year 1883 seems to have been the banner year for distinguished visitors to the Park. The list of arrivals for that year includes the President of the United States and a member of his cabinet; the Chief-Justice and an Associate Justice of the United States Supreme Court; the General, Lieutenant-General, and a large number of other distinguished officers of the army; six United States Senators; one Territorial Governor; a prominent railroad president; the Ministers from Great Britain and Germany; the President of the Admiralty Division of the High Court of Justice, England; three members of Parliament; and a considerable number of other eminent personages, both from this country and abroad.

great pastime *en route* was trout fishing, in which the President and Senator Vest were acknowledged leaders. The phenomenal "catches" of these distinguished sportsmen might pass into history as typical "fish stories," were they not vouched for by the sober record of official dispatches, and the unerring evidence of photographer Haynes' camera. The elaborate equipment of this expedition, the eminent character of its *personnel,* and the evident responsibility resting upon those who conducted it, attracted a great deal of attention at the time, and gave it a prominent place in the annals of Western Wyoming.

Twenty years after the visit of President Arthur occurred the second visit to the Park of a President of the United States during his term of office. Theodore Roosevelt arrived in the Park on the 8th of April, accompanied by John Burroughs, and remained on the Reservation for sixteen days. He visited the country around Yancey's, spending a week in camp there and travelling on horseback. This portion of his trip gave him an excellent opportunity to study the question of game preservation, in which he was deeply interested. He next visited the Firehole Geyser basins and the Grand Cañon of the Yellowstone, travelling all the way by sleigh. The venerable naturalist, his travelling companion, accompanied him on all his journeys, although he had not previously been on horseback in over forty years. On the day of leaving the Park, April 24th, the President assisted in laying the corner stone of the new entrance gate at Gardiner. After the ceremonies, which were conducted under Masonic auspices, he delivered an address on the subject of the Park to an assemblage of about three thousand people who had gathered from all the surrounding country.

CHAPTER XIII.

ADMINISTRATIVE HISTORY OF THE PARK.

The Act of Dedication of the Yellowstone National Park defines in clear terms the purposes for which it was created. These are:

(1) The preservation of its natural curiosities, its forests, and its game.

(2) The reservation of its territory from private occupancy, so that it may remain in unrestricted freedom "for the benefit and enjoyment of the people."

(3) The granting of such leases and other privileges as may be necessary for the comfort and convenience of visitors.

The Act contained no code of laws for the Park, defining offenses and providing for their punishment, nor any legal machinery for enforcing such regulations as the Secretary of the Interior might establish. This condition prevailed for upward of twenty-two years, and during its continuance there were experienced the evils of a license which at times was wholly unchecked, and which it was never possible to bring under thorough control.

This long-standing misfortune was aggravated by another scarcely less serious—the failure of Congress for several years to appropriate funds for the protection and improvement of the Park. For this failure, however, no one can justly be held faultily responsible. The promoters of the Park project had based extravagant expectations upon the results to be derived from leases. They believed that the revenue from this source would amply cover the expense of opening the necessary highways and providing

a proper police force. They did not make due allowance for the fact that there was at that time no railroad within 500 miles; that the new reservation was an almost impassable wilderness, and that the construction of roads and bridges must necessarily precede any profitable tourist business. Neither do they seem to have realized that these leases could not, in the nature of things, yield a revenue commensurate withe the work of opening up so wild and extensive a country. The argument of self-support was a mistaken one. It did an important work, however, for it is doubtful if Congress would have created this reservation had it not believed that no additional public burden was to be incurred thereby.

Left thus without laws for its government and funds for its improvement or protection, the early administration of the Park was necessarily very inefficient. In looking back over those years it is a wonder that it survived at all and was not restored to the public domain.

The administration of the Park was entrusted by the Secretary of the Interior to a Superintendent, and his first choice naturally fell upon Mr. Langford, well known as a member of the famous Washburn Expedition and as an ardent friend of the new reservation. But, from the first, his hands were completely tied. No salary was ever allowed him for his services, nor any funds with which to carry out his duties. He was, therefore, powerless to accomplish effective work. His office, which he held for about five years, was a source of great annoyance to him; for he was frequently, and most unjustly, charged in the public press with responsibility for a condition of things for which he was in no sense to blame.

In 1877, there appeared, as Mr. Langford's successor, one of the unique and picturesque characters in the his-

MAMMOTH HOT SPRINGS TERRACES.

tory of the Park, Philetus W. Norris, of Michigan. He was appointed immediately upon the advent of President Hayes' administration, and held office for nearly five years. Norris filled with varying capacity the roles of explorer, path-finder, poet, and historian in the Park. Naturally a man of extraordinary energy, he entered upon his new charge with a genuine enthusiasm and an unbounded faith in its future value to the people. He was fortunate in receiving from Congress substantial means for carrying out his plans, and with his term of service begins the real administrative history of the Park.

His work covered an extensive range, and left its mark, as its author did his name, in every quarter. He was an untiring explorer. He traveled all the existing trails and penetrated the unknown sections in every direction. He studied the history and antiquities of the Park and the results of his researches possess scientific value. He built the first roads in the Park, opening a vast extent of highway, and although this has all been replaced by later work, it served its original purpose very well. He wrote and published a great deal about the Park and helped revive public interest in it at the time of its greatest need.

Norris was succeeded in February, 1882, by Patrick A. Conger, of Iowa. The two men were as unlike in personal characteristics and views of official duty as it is possible to conceive. Conger possessed none of the love of his work, none of the faith in the Park, none of the enthusiasm, energy, and restless activity that were so characteristic of his predecessor. His administration was weak and inefficient and brought the Park to the lowest ebb of its fortunes. Its only palliating feature, as viewed from this distance, is the fact that its very weakness aroused public sentiment and paved the way to reform in the government of the Park.

As if the unfortunate condition of affairs due to the lack of suitable laws for the reservation were not enough, there arose in the early part of Superintendent Conger's administration a new and even more formidable danger, under the euphemistic title of the Yellowstone Park Improvement Company. Previous to this time, there had been no regular leases in the Park. Several informal permits for occupancy had been granted, and a small number of inferior buildings had been erected. In 1880, there were nine of these buildings, nearly all of them being plain log-cabins, with earth roofs, of the common frontier pattern. Only two, the headquarters building at Mammoth Hot Springs and Marshall's Hotel in the Lower Geyser Basin, rose in dignity above the primitive type. No one as yet thought of remaining in the Park during the winter season.

But it finally dawned upon certain individuals that here was a rare opportunity to exploit the government for their private emolument under the generous guise of improving the Park, and catering to the comfort of the tourist. A company was formed, and a valuable ally secured in the person of the Assistant Secretary of the Interior, who granted a lease of 4,400 acres in tracts of about a square mile each at all the principal points of interest. It was urged in defense of this sweeping grant, that the protection which had failed of realization by every other method could be secured in this way. It was thought that, if responsible parties could be given exclusive control of these natural curiosities, they would, from motives of self-interest, if from no other, preserve them. But such a monopolistic privilege was clearly opposed to the spirit of the Act of Dedication. Why set apart this region for the free and unrestricted enjoyment of the people, if the Secre-

tary of the Interior could give to private parties absolute control of all its most important localities? Was this a proper interpretation of "small parcels of ground," as specified in the act? The danger involved in this action was a grave one, and it aroused a storm of protest throughout the country.

It was about this time also that there began to appear those various railroad and segregation projects which have ever since been a formidable menace to the continued existence of the Park.

It had become apparent as early as 1882, that immediate and radical measures must be adopted if the Park was to be preserved in its original condition. General Sheridan, who passed through that region in 1881, 1882, and 1883, urgently appealed to the public sentiment of the country in favor of some definite action. The Governor of Montana made an earnest appeal to Congress. Other influential voices united in the same cause, and already it was broadly hinted that the only salvation of the Park lay in turning it over to the military. The whole matter was brought prominently before the next Congress, and in March, 1883, a clause in the Sundry Civil Bill containing the annual appropriation for the Park, forbade the granting of leases of more than ten acres to any single party, authorized the Secretary of the Interior to call upon the Secretary of War for troops to patrol the Park, and provided for the employment of ten assistant superintendents who were to constitute a police force. In this way the bold scheme of the Improvement Company was frustrated, and the foundation laid for the present administrative system. The Secretary of the Interior, however, seems not to have wished to avail himself of military assistance, and it was several years before this provision of the law was put into operation.

It was in this same year that the killing of birds and animals in the Park, and the taking of fish by any other method than by hook and line, were absolutely prohibited. Previously, hunting had been allowed so far as was necessary to supply the wants of camping parties—a concession that practically operated as an unrestricted license.

The failure of Congress to enact needed legislation at length became so nearly chronic that relief was sought in another direction. Nearly all the territory of the Park, and all its great attractions, were within the limits of the Territory of Wyoming. Might it not be within the province of territorial legislation to furnish the necessary legal protection? The subject was agitated, and in the winter of 1884, an act was passed, designed "to protect and preserve the timber, game, fish, and natural curiosities of the Park," and for other purposes. The act was very stringent in its provisions, but totally failed of its purpose. The attempt at territorial control of a national institution was in itself a blunder. Then, the officials chosen to execute the law were poorly qualified for their work and displayed a lamentable want of tact and moderation. Some of their arrests were unjust and tyrannical in the extreme. They formed an alliance with the assistant superintendents, federal officials (known in local parlance as "rabbit catchers"), by which the latter shared, as informers, the fines levied by themselves. A law which made abuses like this possible quickly ran its course, and was repealed March 10, 1886.

Although so unwise a measure could not stand, the first effect of its repeal was to advertise the fact that the Park was practically without legal protection. Matters became even worse than before. The common verdict, as gathered from official reports and other sources, is that the body of

police, styled assistant superintendents, were not only inefficient, but positively corrupt. They were, for the most part, creatures of political favoritism, and were totally unused to the service required of them. Commissioned as guardians of the rarest natural wonders on the globe, they not infrequently made merchandise of the treasures which they were appointed to preserve. Under their surveillance, vandalism was practically unchecked, and the slaughter of game was carried on for private profit almost in sight of the superintendents' quarters.

The difficulties that beset the administration of Superintendent Conger were too great for him to grapple with successfully, and he resigned, July 28, 1884. In his place was appointed, August 4, 1884, Robert E. Carpenter, of Iowa. Mr. Carpenter's views of the requirements of his office were clear and positive; and he promptly set about to carry them into execution. He went upon the theory that the Park was created as an instrument of profit to those who were shrewd enough to grasp the opportunity. Its protection and improvement were matters of secondary consideration. Instead of remaining at his post during the winter season, he went to Washington, and there, in concert with a member of the Improvement Company, very nearly succeeded in carrying a measure through Congress by which important tracts upon the Reservation were to be thrown open to private occupancy. So confident of success were these conspirators that they even located claims upon the tracts in question, and their names appeared on claim notices posted to designate the localities. The measure failed of passage, but the scandal of Superintendent Carpenter's conduct led to his prompt removal from office.

On the day of his removal, May 29, 1885, Colonel David

W. Wear, of Missouri, was appointed to the vacancy. Colonel Wear appears to have been well qualified for the place. He set out to reform the administration of the Park, and his intelligent and vigorous measures gave high encouragement to those who had been familiar with the previous condition of affairs. But, as often happens, he was made to suffer for the sins of his predecessors. The bad repute into which the government of the Park had fallen was not easily removed, and Congress finally declined to appropriate money for its continuance. The Secretary of the Interior was thus compelled to call upon the Secretary of War for assistance. The regime of civilian superintendents passed away, and that of the military superintendents began. The change was strenuously opposed by the Secretary of the Interior and by all who held or hoped to hold places under the old order; but the sequel quickly proved the wisdom of Congress.

August 20, 1886, marks the turning point in the administrative history of the Park. Upon that day Captain Moses Harris, First United States Cavalry, relieved the civilian Superintendent of his duties, and soldiers supplanted the so-called assistant superintendents as Park police. Henceforth an entirely new order was to obtain. It was to be seen how much could be accomplished, even in the absence of laws, toward a vigorous and healthful administration. Trespassers upon the Reservation were promptly removed. The regulations were revised and extended, printed upon cloth, and posted in all parts of the Park; and their violation was visited with summary punishment to the full extent of the Superintendent's authority. Abuses of leasehold rights were searchingly inquired into and reported to the Department. As soon as this show of real authority was made manifest, and it

became apparent that here was a man who meant what he said, a great part of the difficulty was over. Nothing in fact conduces so much to the infraction of law as a belief in the incompetency or insincerity of those delegated to enforce it, and the removal of this cause was a long step in the right direction.

The system thus inaugurated still continues with every prospect of permanency, although Congress has never taken the necessary steps to make it permanent. The military commander is still styled the *Acting* Superintendent. But it is not probable that public opinion will ever sanction a return to the old order. The administrative machinery has completely adjusted itself to the present system. A garrison of sufficient size to accommodate a squadron of cavalry has been established at Mammoth Hot Springs, and numerous permanent station houses have been built throughout the Park for the use of small detachments of troops in patrolling the Reservation. The system gives general satisfaction and is not likely to be disturbed.

The new Hotel Company had a meteoric career, promising great things, but accomplishing no permanent improvement except the partial construction of a pretentious but ill-conceived structure, which has become widely known as the Mammoth Hot Springs Hotel. The company's fortunes quickly collapsed, and the opening of the tourist season of 1885 found the great building in the possession of unpaid workmen, who held it under a kind of military guard until their wages should be paid.

The Northern Pacific Railway Company then came to the rescue, bought out the Improvement Company and certain lesser concerns, and organized a new company called the Yellowstone Park Association. This company completed the Mammoth Hot Springs Hotel, and has since

built hotels at the following points: Norris Geyser Basin, three buildings, two of which have been destroyed by fire; Lower Geyser Basin, the Fountain Hotel; Upper Geyser Basin, two buildings, one of which has been destroyed by fire; and one hotel each at the Yellowstone Lake and the Grand Cañon.

At first the carrying of tourists through the Park was an adjunct of the hotel business, but in 1891 the Interior Department granted this privilege to a new company called the Yellowstone Park Transportation Company, and the two companies operated thereafter for many years as independent concerns. The transportation system of the Park, which has now developed into the best equipped organization of its kind in the world, was, in its essential features, the creation of Silas S. Huntley, who gave it his undivided attention from 1892 until 1901, the date of his death. By virtue of his wide acquaintance throughout the country, his intimate knowledge of the Park, and his genuine interest in its welfare, he practically controlled its administration for many years, and died lamented as one of the best friends it ever had.

In 1901, the Northern Pacific sold the hotel property to the owners of the Transportation Company, and the two business were operated during the next two years under the same management. In the fall of 1902 the Railway Company took back its hotel property and bought an interest in the Transportation Company, so that it now virtually controls the tourist business of the Park.

About 1890 a privilege was granted to W. W. Wylie, of Bozeman, Montana, to transport tourists through the Park and subsist them in "permanent camps." This privilege was renewed year after year, and the management of the business was carried on under the name of the Wylie

Camping Company. Mr. Wylie succeeded in building up a lucrative trade. His capable management, personal interest in the pleasure of tourists, and the cheaper rates and longer visit that he gave them brought to his system a wide popularity.

In 1899, a new company was formed to transport tourists from the Montana branch of the Oregon Short Line Railroad (Union Pacific) into the Park by the western entrance. It was called the Monida and Yellowstone Stage Company, and has been built up from a small beginning to a promising business. It is organized and controlled by Mr. F. J. Haynes, the licensed photographer of the Park, whose views of the Park scenery are well known the world over. The plant of this company is similar to that of the Yellowstone Park Transportation Company, and its patrons are cared for at the regular hotels.

About the year 1890, the privilege was granted of transporting tourists by boat over the Yellowstone Lake between two points on its shores touched by the road system. The beneficiary of this privilege, which has been of an exclusive or monopolistic character, is Mr. E. C. Waters, President and principal owner of the Yellowstone Lake Boat Company.

In the early part of Superintendent Conger's administration the government took up in earnest the question of road construction in the Park. Norris had opened up a great extent of roadway, but it was the crudest possible work, and the money thus spent left no permanent result. To give this matter systematic direction an engineer officer of the Army was detailed, in 1883, to take charge of the work. This officer was Captain D. C. Kingman, of the Corps of Engineers, whose term of duty ran through three

years and resulted in laying the foundation of the present road system of the Park. With the exception of about four years the work has remained under the Engineer Department, and was definitely placed there by Act of Congress of June 6, 1900.

The year 1894 was an important landmark in the administrative history of the Park. On May 4, of that year, the desired code of laws was enacted, and on August 3, of the same year, an act was passed further regulating the question of leases and privileges. The circumstances attending the passage of the National Park Protective Act are worthy of record, because it was evidently their sensational character that aroused Congress to action.

The preservation of the Park buffalo herd has always been a matter of deep public interest. There is a well-nigh universal desire that this noble animal, which has played such a part in the frontier history of our country, shall survive in its native freedom within the territory set apart as a national park and game preserve. Accordingly the people have followed with extreme jealousy the welfare of this herd, and have been impatient at any evidence of neglect on the part of Congress or the Department in protecting it.

In the month of March, 1894, a notorious poacher was caught by a government scout in the act of killing buffalo in their winter range in the Pelican Valley. Quite a number of slain buffalo were found—enough to show that, with a little more time, he would have exterminated the herd altogether. The arrest of this man was a bold and thrilling exploit, and was executed with brilliant success. There was present in the Park at the time a representative of *Forest and Stream,* a journal which has always been one of the Park's most enthusiastic guardians, and through this

agency the news was promptly and effectively brought to the attention of Congress. The imminent danger of total annihilation of the herd produced the desired effect, and within a month the long-sought legislation had been effected.

A formidable danger which for twenty years has threatened the integrity of the Park, is the effort to get railroads across its territory. The policy of the government in regard to this Reservation is to maintain it as nearly as possible in its natural condition, unchanged by the hand of man. The sentiment of the country is almost a unit in favor of this policy. Every year demonstrates its wisdom as the people come to appreciate more and more the rare foresight of the government in reserving one spot in the national domain where original conditions may remain undisturbed. It is the desire to restrict roads to the smallest extent consistent with convenient access to the principal objects of interest; to restrict buildings to the minimum number required for the convenience of visitors; and particularly to keep out such modern innovations as railroads, and even electric lines.

It is not necessary to rehearse here the arguments in favor of this policy, for they are well understood. They may all be summed up in the general fact that the moment railroads are built through the Park it loses forever that original condition which is one of its greatest charms. They would undoubtedly work serious damage to the game, and to the forests, to say nothing of their effect on the natural beauty of this region. Electric lines would be less objectionable than steam roads, but the same fundamental argument applies to them as well. The people prefer not to find these things in this Reservation; they prefer to travel behind horses, even if the discomforts are greater, and they

would rather have the government remove these discomforts by creating a perfect system of roads than ever grant the privilege of building a railway line in the Park. This question was once put to a vote of the tourists, and their voice was ninety-five per cent. in favor of the absolute exclusion of every form of railroad.

There is now but little real need of further legislation by Congress in the interests of the Park. The necessary provision should of course be made for the maintenance of adequate protection, and means should be provided to perfect the system of roads. Happily these are duties involving no onerous burden. They require no continuing outlay to "beautify and adorn," for Nature has attended to these matters herself. The further policy of the government in regard to the Park should be strictly negative, with the sole object of preserving it unimpaired, as its founders intended, for the "benefit and enjoyment" of succeeding generations.

CHAPTER XIV.

GEOGRAPHICAL NAMES IN THE YELLOWSTONE PARK.

In common experience, the importance of geographical names lies in their use as a means of identification. To describe an object there must be a name, and for this purpose one name is as good as another. But if the reason be sought why a particular name happened to be selected, it will generally be found to arise, not from this practical necessity, but from some primary fact or tradition, or from some distinguished character, in the annals of the community where it occurs. In its mountains and valleys, its lakes and streams, and in its civil divisions, the cradle history of a country may always be found recorded.

In newly-discovered countries, the naming of geographical features is the dearest prerogative of the explorer, as it is also the one most liable to abuse from personal vanity or egotism. The desire to attach his name, or those of his personal friends, to the prominent landmarks of the globe, where the eye of posterity may never escape them, is a weakness from which no discoverer has yet shown himself free.

In a region like the Yellowstone National Park, destined for all time to be a resort for the lovers of science and pleasure, this temptation was quite irresistible; so much so, that, when the expeditions of 1870 and 1871 left the field, they left little worth naming behind them. And yet the honor thus gained has not, we venture to say, been all that its votaries desired. Small is the number of tourists who stop to inquire for whom Mary Lake, DeLacy Creek,

Santa Clara County
Free Library
San Jose, Cal.

or Stevenson Island was named. Fewer still are aware that Mt. Everts was not christened in honor of the distinguished American statesman of similar name, but in commemoration of one of the most thrilling individual experiences in American history. So with all these personal names. The lively satisfaction with which they were given finds no counterpart in the languid indifference with which the modern visitor mechanically repeats them.

Inasmuch as it fell to the lot of the United States Geological Survey* to originate a great many of the names in our western geography, it is interesting to know from official sources the principles which governed in this important work. Writing upon this point, Dr. Hayden says:†

"In attaching names to the many mountain peaks, new streams, and other geographical localities, the discovery of which falls to the pleasant lot of the explorer in the untrodden wilds of the West, I have followed the rigid law of priority, and given the one by which they have been generally known among the people of the country, whether whites or Indians; but if, as is often the case, no suitable descriptive name can be secured from the surroundings, a personal one may then be attached, and the names of

* The organization now known as the United States Geological Survey dates from 1879, when it superseded the various independent surveys which had previously been made under King, Wheeler, Powell and Hayden. The Hayden Surveys, which are alone here considered of those prior to 1879, were known as the United States Geological (Geological and Geographical, in one instance) Survey of the Territories. Although the shorter name, United States Geological Survey, is in all cases used throughout this work, it refers, since 1879, to the present organization, and before that time to the Hayden Surveys.

† Page 8, Fifth Annual Report of Dr. Hayden.

eminent men who have identified themselves with the great cause, either in the fields of science or legislation, naturally rise first in the mind."

In the more recent and thorough survey of the Park by the United States Geological Survey, it became necessary to provide names for those subordinate features which, in a less restricted field, the early explorers had thought unworthy of notice. Prof. Arnold Hague, upon whom this work has principally fallen, thus states the rule which he has followed:*

"In consultation with Mr. Henry Gannett, geologist in charge of geography, it was agreed that the necessary new names to designate the unnamed mountains, valleys, and streams should be mainly selected from the beasts, birds, fishes, trees, flowers, and minerals found within the Park or the adjacent country."

The christening of the hot springs and geysers of the Park have been singularly fortunate. The names are in all cases characteristic. They are not studied efforts, but are simply the spontaneous utterances from first impressions by those who had never seen, and had heard but little of, similar phenomena. It is doubtful if the most careful study could improve them, and tourists will agree with General Poe, who referred as follows to this subject when he visited the Park in 1877:†

"The region of these geysers has been rightly named Fire Hole, and one almost wonders that in this country, where the tendency is to name natural objects after men who have a temporary prominence, this interesting place and its

* Page 152, Part I, Annual Report United States Geological Survey for year ending June 30, 1887.

† Page 79, "Inspection made in the Summer of 1877," etc.

assemblage of wonders should have so completely escaped, and in general and in particular received names so very appropriate."

In the race for the geographical honors of the Park, the prize fell neither to the United States Geological Survey nor even to Colonel Norris, though each was a close competitor. It was won by that mythical potentate of whose sulphurous empire this region is thought by some to be simply an outlying province. Starting with "Colter's Hell," the list grew until it contained "Hell Roaring Creek," "Hell Broth Springs," "Hell's Half Acre," "Satan's Arbor," and the Devil's "Den," "Workshop," "Kitchen," "Stairway," "Slide," "Caldron," "Punch Bowl," "Frying Pan," "Well," "Elbow," "Thumb," "Inkstand," etc., etc. It is some satisfaction to know that this rude and fiery nomenclature is gradually falling into disuse.

In a measure from sympathy with the purpose of the early name-givers, and to help those who take an interest in such matters to know when, by whom, and why the geographical names of the Park were given, some of the more important will be explained here. The great proportion of them fall naturally under two heads—Personal and Characteristic. The personal names may in turn be classified into names given for the pioneers in the Park; for its explorers; for those who have served it in the fields of science or literature; and for those whose only claim is that of friendship for the name-giver. To these more general classes may be added a few names given for Indian tribes, and a dozen or so that may be termed eccentric or fanciful.

Baronett Peak is named for C. J. Baronett, "Yellowstone Jack," a famous scout and guide, closely connected with

the history of the National Park, and builder of the first bridge across the Yellowstone River.

Colter Peak, it need hardly be said, is for John Colter, the original pioneer. The mountain is located southeast of the Yellowstone Lake.

Yount Peak commemorates an old trapper and guide of that region. The mountain is the source of the Yellowstone River.

Conant Creek, in the southwest corner of the Park, is for one All Conant, who was in that country as early as 1865, and came near losing his life in this stream.

Gardiner River, next to Yellowstone, is the most familiar and important name in the Park. The identity of the individual for whom it was given was long in doubt, and has been definitely settled only within the past three years. His name was Johnson Gardner, and he was one of the so-called free trappers. There are extant articles of agreement between him and Kenneth McKenzie, the bourgeois in charge of the American Fur Company post at Fort Union, relating to equipment and furs for the year 1832. There are also a statement of Gardner's account at Fort Union in the summer of 1832 and a bill of lading of furs shipped on the bull boat *Antoine* from the "Crossing of the Yellowstone," July 18th of the same year.

This was undoubtedly the individual for whom Gardiner River was named. The discrepancy in the spelling has no significance. The first certain reference to both stream and name, placing the identity of each beyond dispute, occurs in the letter from Father De Smet, quoted elsewhere. The name is thus seen to be the oldest in the Park except the name Yellowstone.

Bridger Lake requires no explanation. The name of this famous pioneer survives in many a feature of our western

geography, but in none with greater honor than in this little lake among the mountains that he knew so well; and near the source of that majestic stream with which so much of his eventful life was identified.

Heart Lake was named prior to 1870 for an old hunter by the name of Hart Hunney, who in early times plied his trade in this vicinity. He was possibly one of Bonneville's men, for he seems to have known the General well and to have been familiar with his operations. He was killed by a war party of Crows in 1852.

The spelling, *Heart,* dates from the expeditions of 1871. The notion that the name arose from the shape of the lake seems to have originated with Captain Barlow. It has generally been accepted although there is really no similarity between the form of the lake and that of a heart. Lewis Lake is the only heart-shaped lake in that locality.

Henry Lake is the name of a noted lake outside the limits of the Park passed by tourists entering the Park from the west. It is named for a celebrated fur trader, Andrew Henry, who built a trading post in 1810 on Henry Fork, the outlet of the lake.

Jackson Lake was so called for David Jackson, a noted mountaineer and fur trader, and one of the first three partners of the Rocky Mountain Fur Company. This lake was discovered by John Colter and was named by Clark *Lake Biddle,* in honor of Nicholas Biddle, who first gave to the world an authentic edition of the journal of the celebrated Lewis and Clark Expedition. This original name never gained any currency.

Leigh Lake is for Richard Leigh ('Beaver Dick"), a noted hunter, trapper and guide in the country around the Teton Mountains. The nickname "Beaver Dick" arose, not from the fact that Leigh was an expert beaver trapper, but

on account of the striking resemblance of two abnormally large front teeth in his upper jaw to the teeth of a beaver. The Indians called him "The Beaver."

Such are the principal names given for the pioneers of this region—those who entered it before the era of exploration. The explorer list is much more voluminous. Among the first under this head are those relating to the Lewis and Clark Expedition of 1804-6. There are three of these names, *Gallatin, Madison,* and *Lewis.* The first designates one of the Three Forks of the Missouri, which takes its rise in the northeast corner of the Park in the Gallatin Mountains. The second is also one of the Three Forks, and rises (through its largest tributary, the Firehole River) in Madison Lake, ten miles south of Lone Star Geyser. Lewis Lake and River are, of course, named in honor of the famous explorer, Captain Merriwether Lewis.

Raynolds Pass, the name of a feature which lies outside the Park near Henry Lake, dates from the Raynolds Exploring Expedition of 1859-60.

DeLacy Creek commemorates the prospecting expedition across the Park in 1863 under the leadership of Walter W. DeLacy, a well-known civil engineer of Montana.

Folsom Peak is a well-earned honor that has fallen upon David M. Folsom, the explorer of 1869, and the first individual who ever made anything like a complete report of a tour of the Park.

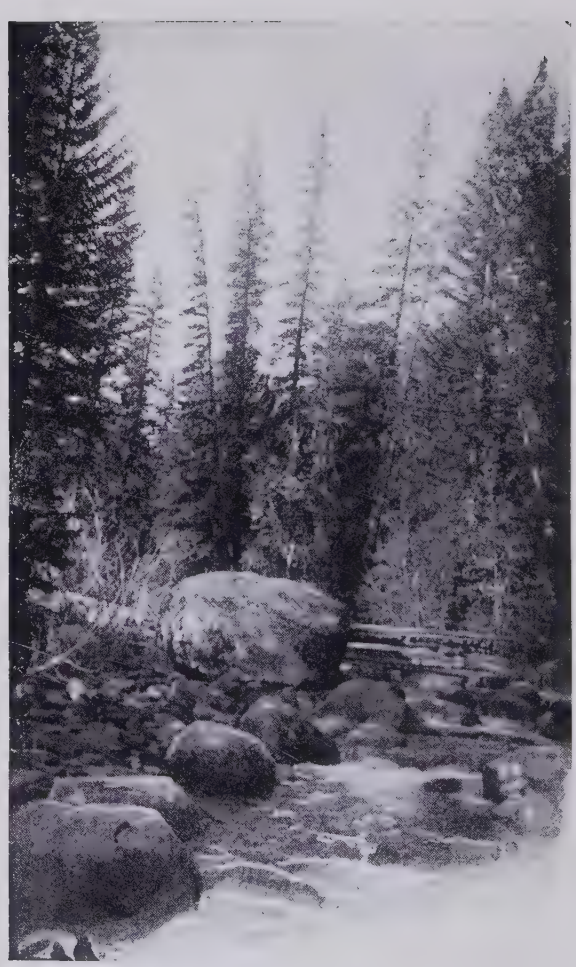
Of the ten members of the Washburn Expedition of 1870, including Lieutenant Doane, five bequeathed their names to prominent mountains of the Park. The leader of the party was particularly fortunate, for his name, *Washburn,* is on the most noted summit in the Park, a mountain which will forever be one of the chief delights of visitors to this region.

Langford and *Doane* are names that have found enviable resting places on two noble summits of the Absaroka Range, east of the Yellowstone Lake.

Hedges Peak does honor to the member of the party who first proposed the idea of converting this region into a National Park, and whose subsequent writings did much to carry that idea into effect.

Truman G. *Everts,* the benighted wanderer, was rewarded for his suffering and peril by having his name given to a famous feature of the Park, the bold and lofty rampart that faces Mammoth Hot Springs from across the Gardiner River. The location of the name was an awkward mischance. The mountain which should bear the name is Mt. Sheridan. It was named for Everts by the Washburn Party the night before he was lost, in recognition of his having been the first white man (except Mr. Hedges, who was with him) known to have visited its summit. In the writings of the Washburn Party, after their return, it is so used; one very interesting article, by Mr. Hedges, with this name as a title, being published in the *Helena Herald* before it was known that Mr. Everts had been found. But the name was finally given to the high land between the Gardiner and the Yellowstone, a feature which is not a mountain at all, and which is ten miles from where Everts was found. The actual locality of the finding was erroneously supposed to be near "Rescue Creek."

Following the Washburn Expedition came those of 1871. Captain Barlow was the only member of his party who succeeded in leaving his name in the Park. For several years it designated the upper course of Snake River, but was later transferred to a neighboring mountain, *Barlow Peak,* in order that the true name of the river might apply to its source.



Tower Creek.

If Captain Barlow left no other names of his party, he did leave three distinguished names of Army Officers who had officially aided in his exploration or had otherwise labored in the interest of that region. He remembered the chief of his Corps in *Mt. Humphreys,* and the commander of the Military Department in which the Park country was then situated in *Mt. Hancock;* and that distinguished soldier and faithful friend of the Park, who often visited it and always worked for its interest, in *Mt. Sheridan.*

The United States Geological Survey is represented in the Park nomenclature beyond any other organization, and not always with the best judgment. Some important names, like that of Dr. Arnold Hague and Mr. Henry Gannett, are absent, while others of no especial claim or merit are present.

The distinguished name of Dr. *Hayden* is perpetuated in the valley of the Yellowstone River, between Mud Geyser and the Falls.

The name of James Stevenson, Hayden's right-hand man, and by some considered his superior as an explorer, designates one of the trio of Peaks—Langford, Doane and *Stevenson*—in the Absaroka Range. There is also a *Stevenson Island* in the Yellowstone Lake.

Mt. Chittenden is for George B. Chittenden; *Bechler River,* for Gustavus A. Bechler; *Coulter Creek,* for John M. Coulter, the botanist; *Hering Lake,* for Rudolph Hering, the eminent civil engineer; *Mt. Holmes,* for W. H. Holmes, geologist; *Carrington Island,* for Campbell Carrington, zoologist; *Peale Island,* for Dr. A. C. Peale, author of the elaborate report upon hot springs and geysers in the Hayden report of 1878.

Jones Pass and Jones Creek are for Captain W. A. Jones, who led an expedition into the Park from the east in 1873

Mt. Hoyt is for Hon. John W. Hoyt, who, as Governor of Wyoming Territory, made a reconnaissance into the Park in 1881.

Mason Creek is in honor of Major J. W. Mason, who commanded Governor Hoyt's escort. Both of the foregoing names were given by Colonel Norris.

Gibbon River was named by Colonel Norris for General John Gibbon, who explored this stream in 1872.

A few names have been given in recognition of scientific, literary or other service to the Park.

Bunsen Peak is for the eminent chemist and physicist, Robert Wilhelm Bunsen; inventor of the Bunsen electric cell and of the Bunsen gas burner; co-discoverer with Kirchoff of the principle of Spectrum Analysis; and the first thorough investigator of the phenomena of geyser action.

Dunraven Peak was named by Henry Gannett for the Earl of Dunraven, "whose travels and writings have done so much toward making this region known to our cousins across the water."

Dunraven visited the Park in 1874. In 1876, he published his "Great Divide," describing his travels in the West. Colonel Norris named this peak after himself, and coupled it with Mt. Washburn in a characteristic poem. But the United States Geological Survey decided otherwise, and transferred the Colonel's name to the northeast corner of the Park.

Mt. Moran, one of the Tetons, was named for Thomas Moran, whose paintings of the scenery of this region have done so much to make it known to the world.

Mt. Norris, Norris Pass and *Norris Geyser Basin** are,

* This basin was first explored, described and opened up to tourists by Colonel Norris. It was, however, discovered in

of course, named for P. W. Norris, second Superintendent of the Park. Elsewhere we have given a sketch of the enthusiastic and loyal friend of the Park for whom these features were named. It was not the Colonel's fault that his name was restricted to so few places along the route of the tourist.

Mt. Huntley, in the Gallatin Range, was named for the late S. S. Huntley, who built up the present admirable system of tourist transportation in the Park.

Many of the personal names in the Park were given from motives of friendship or a desire to honor distinguished officials. In several instances the persons so honored never saw the Park.

Abiathar Peak is for Charles Abiathar White, paleontologist, United States Geological Survey.

Atkins Peak is for John D. C. Atkins, at one time United States Indian Commissioner.

Mt. Schurz was named for the Secretary of the Interior under President Hayes.

Lamar River is for the person who held the same portfolio under President Cleveland.

Kepler Cascade was named by Colonel Norris for the twelve-year-old son of Governor Hoyt.

Virginia Cascade is for the daughter of the late Charles

1872 by E. S. Topping and Dwight Woodruff, who were led in that direction by noticing from the summit of Bunsen Peak a vast column of steam ascending to the southward. The day after this discovery, a tourist party, including a Mr. and Mrs. H. H. Stone, of Bozeman, Montana, visited it from Mammoth Hot Springs, and then continued their course, by way of the general line of the present route, to the Firehole Geyser Basin. Mrs. Stone was the first white woman to visit the Park.

Gibson, at one time President of the Yellowstone Park Association.

Isa Lake and *Craig Pass,* where the road first crosses the Continental Divide, are for the first tourists who visited these features.

Mary Lake (and with it *Mary Mountain*) was named in 1873, and a definite record of the christening has been left us by the Rev. E. J. Stanley:

"We passed along the bank of a lovely little lakelet, sleeping in seclusion in the shade of towering evergreens, by which it is sheltered from the roaring tempests. It is near the Divide, and on its pebbly shore some members of our party unfurled the Stars and Stripes, and christened it Mary's Lake, in honor of Miss Clark, a young lady belonging to our party."

Frank Island, in the Yellowstone Lake, is for the brother of Henry W. Elliott, a member of the Hayden Expedition of 1871.

Mary Bay is for Mary Force, a sweetheart of another member of the same expedition.

The Annie, first boat* on the Yellowstone Lake, was christened for Miss Anna L. Dawes, daughter of Hon. H. L. Dawes, at that time a Senator of the United States.

The native tribes of the continent are remembered to a small extent in the nomenclature of the Park, as much, perhaps, as they ought to be considering their small connection with it.

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* The frame and cover for this boat were brought from Salt Lake City and assembled at the lake. In the well-known picture of this historic craft, the persons in the boat are James Stevenson and Henry W. Elliott.

Absaroka Range is given for the Crow Indians, whose immemorial home, Absaroka, was in the valley of the Big Horn River at the eastern base of these mountains. The range was first known by the name Yellowstone, and in 1873 was rechristened by Major Jones, Sierra Shoshone. The present name was given about the year 1885.

Bannock Peak, in the Gallatin Range, is from the name of a tribe of Indians who inhabited the country to the southwest of the Park, and were finally settled on a reservation in southern Idaho. What is known as the Great Bannock Trail, passed along the valley of Indian Creek, some distance south of this mountain. The spelling here given is that which custom seems finally to have settled upon; but *Bannack* would more nearly express the original pronunciation. The various spellings, some sixteen in number, come from the original *Panaï'hti,* or *Bannaï'hti,* meaning southern people.

Joseph Peak is for the famous chief of the Nez Percé Indians, who made a forced tour of the Park in the year 1877.

Sheepeater Cliffs were so named by Colonel Norris in commemoration of the only tribe of Indians that ever permanently dwelt in the Park. These cliffs are the magnificent walls of the Middle Gardiner Cañon below Osprey Falls.

It was upon one of the "ancient and but recently deserted, secluded, unknown haunts" of these Indians, that Colonel Norris, "in rapt astonishment," stumbled one day, and was so impressed by what he saw, that he gave the neighboring cliff its present name. He thus describes this retreat:*

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* Page 10, Annual Report Superintendent of the Park for 1879.

"It is mainly carpeted with soft grass, dotted, fringed, and overhung with small pines, firs and cedars, and, with the subdued and mingled murmur of the rapids and cataracts above and below it, and the laughing ripple of the gliding stream, is truly an enchanting dell—a wind and storm sheltered refuge for the feeble remnant of a fading race."

Indian Creek, a tributary of the Gardiner, is a stream along which ran the old Bannock Trail.

Indian Pond describes a beautiful little sheet of water close to the north shore of the Yellowstone. Its banks were a favorite camping ground for the Indians.

Nez Percé Creek requires no explanation to those who have read the story of the flight of Chief Joseph and his braves up the valley of this stream in 1877.

Shoshone, the name of a family of Indians that occupied the whole country south and southwest of the Park as far as to the Sierra Nevada Mountains, designates two natural features of the Park, Shoshone Lake and Shoshone River. The Lake, which is one of the sources of Snake River, was first named De Lacy Lake, after its discoverer. The Washburn Party (1870) appear to have named it after their leader. In 1871, Doctor Hayden, failing to identify its location, and believing it to be tributary to the Madison River, renamed it Madison Lake. It is this name which appears on the first map of the Park and in the Act of Dedication, where the west boundary of the Park is described as being "fifteen miles west of the most western point of Madison Lake." In 1872, when the correct drainage of the lake was discovered, the name "Madison Lake" was transferred to its present location (See "Madison Lake"), and its place supplied by "Shoshone Lake." The Act of Dedication is therefore misleading, and it is neces-

sary to know that "Madison Lake" of the Act, is "Shoshone Lake" now, in order to understand the true location of the west boundary of the Park.*

Shoshone River received its first name, Stinkingwater, from John Colter, who so named it from a tar spring of very strong odor near the junction of the two forks of the stream. The river itself is one of the purest and most beautiful in the mountains, and the original name was so inappropriate that it has been changed to its present name by an Act of the Legislature of Wyoming.

There are a few names which do not fall under any of the above classes and some which are eccentric and fanciful in character.

Calfee and *Miller Creeks* were named by Colonel Norris, and this is his record of the fact:

"Some seven miles above Cache Creek we passed the mouth of another stream in a deep, narrow, timbered valley, which we named Calfee Creek, after the famous photographer of the Park. Five miles further on, we reached the creek which Miller recognized as the one he descended in retreating from the Indians in 1870, and which on this account, we called Miller's Creek."

Cache Creek was so named from the following circumstance: A prospecting party under one Austin were in camp on this stream when they were surprised by Indians, and all their stock stolen except one or two mules. Being unable to carry all their baggage from this point, they *cached* what they could not place on the mules, or could not themselves carry.

Crevice, Hellroaring and *Slough Creeks,* all names of

* Page 250, Sixth Annual Report of Dr. Hayden.

tributaries of the Yellowstone River from the mountains along the north border of the Park, are survivals of the early prospecting days in this region. Topping, in his "Chronicles of the Yellowstone," records the circumstance that gave rise to the names:

"They [a prospecting party] found gold in a crevice at the mouth of the first stream above Bear, and named it, in consequence, Crevice Gulch. Hubbel went ahead the next day for a hunt, and upon his return he was asked what kind of a stream the next creek was. 'It's a hell roarer,' was his reply, and Hell Roaring is its name to this day. The second day after this, he was again ahead, and, the same question being asked him, he said: ''Twas but a slough.' When the party came to it, they found a rushing torrent, and, in crossing, a pack horse and his load were swept away, but the name of Slough Creek remains."

Boone Creek was named prior to 1870, for Robert Withrow, an eccentric pioneer of Irish descent, who used to call himself "Daniel Boone the Second."

Solution Creek is the outlet of Riddle Lake.

Surprise Creek was so named because its course, as made known by official explorations, was surprisingly different from what it had before been understood.

Delusion Lake was long supposed to be an arm of the Yellowstone Lake, its index "finger" in the fanciful resemblance of the lake to the human hand. This delusion was cleared away by official explorations.

Riddle Lake is thus accounted for by Professor Bradley, of the United States Geological Survey:

"'Lake Riddle' is a fugitive name, which has been located at several places, but nowhere permanently. It is supposed to have been used originally to designate the mythical lake, among the mountains, whence, according to

the hunters, water flowed to both oceans. I have agreed to Mr. Hering's proposal to attach the name to this lake, which is directly upon the divide at a point where the waters of the two oceans start so nearly together, and thus to solve the unsolved 'riddle' of the 'two-ocean-water.'"

This was a year before Captain Jones verified the existence of Two-Ocean-Pass.

This completes the list of personal names in the Park, and it now remains to note a few of the more important that we have classed as characteristic—names expressive of the form, color, composition, or other peculiarity of the object named.

Cinnabar Mountain, a prominent feature near the northern entrance to the Park, was "so named from the color of its rocks, which have been mistaken for Cinnabar, although the red color is due to iron."—Hayden. The *Devil's Slide* (also named before 1870) is on this mountain.

Electric Peak, the highest mountain in the Park, received its name from the following circumstance, described by Mr. Henry Gannett, who ascended the mountain with surveying instruments, July 26, 1872:

"A thunder-shower was approaching as we neared the summit of the mountain. I was above the others of the party, and, when about fifty feet below the summit, the electric current began to pass through my body. At first I felt nothing, but heard a crackling noise, similar to a rapid discharge of sparks from a friction machine. Immediately after, I began to feel a tingling or pricking sensation in my head and the end of my fingers, which, as well as the noise, increased rapidly, until, when I reached the top, the noise, which had not changed its character, was

deafening, and my hair stood completely on end, while the tingling, pricking sensation was absolutely painful. Taking off my hat partially relieved me. I started down again, and met the others twenty-five or thirty feet below the summit. They were affected similarly, but in a less degree. One of them attempted to go to the top, but had proceeded but a few feet when he received quite a severe shock, which felled him as if he had stumbled. We then returned down the mountain about three hundred feet, and to this point we still heard and felt the electricity."

Elephant Back was so named "On account of the almost vertical sides of this mountain, and the rounded form of the summit."—Hayden.

This name, as now applied, refers to a different feature from that originally designated by it. Many years before the Park was discovered, it was used to denote the long ridge of which Mt. Washburn is the commanding summit, and which was distinctly visible from beyond the present limits of the Park, both north and south.

Factory Hill.—The term "factory" has at various times been applied to several different localities in the Park, because of their striking resemblance on frosty mornings to an active factory town. The resemblance was noted as far back as 1829. The name has now become fixed, as above indicated.

Index Peak and *Pilot Knob* are two imposing summits near the northeast corner of the Park, and received their names before 1870. "One of them derives its name from its shape,—like a closed hand with the index-finger extending upward, while the other is visible from so great a distance on every side that it forms an excellent landmark for the wandering miner, and thus its appropriate name of Pilot Knob."—Hayden.

Roaring Mountain "takes its name from the shrill, penetrating sound of the stream constantly escaping from one or more vents near the summit."—Hague.

Sepulcher Mountain is so called from the striking feature on its northern slope which resembles a tomb or sepulcher with a prominent footstone and headstone.

The *Teton Mountains* were named by the French trappers as early as 1811 from the fancied resemblance of these peaks, when seen from a distance, to the nipple of the human breast. The name is now nearly a century old and has passed into all the literature describing that country, particularly that of its fur trade era, the most romantic and fascinating in western history. Indeed, it has become the classic designation of the most interesting historic summit of the Rocky Mountains. That it should always retain this designation in memory of the nameless pioneers who have been guided by it across the wilderness, and many of whom have perished beneath its shadow, would seem to be a self-evident proposition. Individual merit, no matter how great, can never justify the usurpation of its place by any personal name whatever. An attempt to do this was made in 1872 by the United States Geological Survey who rechristened it Mt. Hayden. The new name has never gained any local standing, and although it has crept into many maps its continued use ought to be discouraged. It is greatly to the credit of Dr. Hayden that he personally disapproved the change, so far at least, as very rarely, if ever, to refer to the mountain by its new name.

Firehole River is a name the origin of which has heretofore apparently been misunderstood. It dates from back as far as 1830, when the valley was called by the trappers "Burnt Hole," from a great forest fire which had recently

swept over it, the traces of which are distinctly visible at the present day. The record on this point is definite and conclusive.

Atlantic and Pacific Creeks flow out of Two-Ocean Pass, where a mountain stream divides, sending its waters through these streams to the two oceans.

Outlet Creek was the outlet of Yellowstone Lake when it was a tributary of the Columbia River.

Pelican Creek very properly designates a stream the mouth of which, on the north shore of the Yellowstone Lake, is a great resort for this particular species of bird. Pelican Roost is an island near by.

Soda Butte Creek is so named from an extinct geyser, or hot spring mound, near the mouth of that stream.

Tangled Creek, in the Lower Geyser Basin, is a most appropriate name. The stream is a perfect network of separate channels which cross and recross and interlace with each other in the most confusing fashion.

Violet Creek, in Hayden Valley, is bordered with dense growths of the wild violet.

Tower Falls was named by the Washburn party, and this is their record of the fact and the reason therefor:

"By a vote of a majority of the party this fall was called Tower Fall."—Washburn.

"At the crest of the fall the stream has cut its way through amygdaloid masses, leaving tall spires of rock from 50 to 100 feet in height, and worn in every conceivable shape. . . . Several of them stand like sentinels on the very brink of the fall."—Doane.

Sylvan Lake is not surpassed by any name in the Park in point of fitness. No finer example of sylvan scenery can be found anywhere than that embracing this exquisite sheet of water.

There are many other names in the Park, all of them given for the fauna and flora that flourish there. They are not characteristic in the sense that a particular name has any especial application to the object which it designates. The features so named are all of minor importance and it is not essential to enumerate them here.

CHAPTER XV.

AN INDIAN CAMPAIGN THROUGH THE YELLOWSTONE PARK.

In a letter dated at Fort Ellis, Montana Territory, August 19, 1877, addressed to the Hon. George W. McCreary, Secretary of War, the writer, General W. T. Sherman, then on a tour of inspection of the "country north of the Union Pacific Railroad," tells of his recent visit to the Yellowstone National Park. This was about the period when our Indian wars in the Far West were at their height. Only a year had elapsed since the Custer massacre. It was the crisis of the Indian military question. There was at that time scarcely a spot in the whole Missouri and Yellowstone Valleys that was safe from Indian depredations. Naturally, therefore, General Sherman had his mind upon this subject when his small party, comparatively unprotected, were traveling through the wilds of the National Park. But he saw nothing there to excite his fears, and in the letter above referred to, says: "We saw no signs of Indians and felt at no moment more sense of danger than we do here." It will presently be seen how delusive was this fancied security, and by how narrow a margin it escaped resulting disastrously to the General's party.

The tour from Fort Ellis to the Park and return had taken from August 4th to August 18th. On the latter date, the party met an ingoing company of tourists from Helena composed of the following persons: A. J. Weikert, Richard Dietrich, Frederic Pfister, Joseph Roberts, Charles

Kenck, Jack Stewart, August Foller, Leslie Wilke, L. Duncan, and Benjamin Stone (colored cook). The party followed the usual route to the Grand Cañon and Falls of the Yellowstone, where they were in camp August 24th.

As they were entering the territory of the Park, another party was on the point of leaving it after a tour of about two weeks. This party was composed of the following persons, most of whom were from Radersburg, Montana: George F. Cowan and wife, Frank and Ida Carpenter, brother and sister of Mrs. Cowan, Charles Mann, William Dingee, Albert Oldham, A. J. Arnold, and a Mr. Meyers. They had formed a permanent camp in the Lower Basin, near where the Fountain Hotel now stands, and from that point had made daily short excursions to the various localities of interest. They all visited the geyser basins and some of the party crossed to the Lake and Cañon of the Yellowstone. They must have been seen by the Sherman party, for they were directly in its route. The party completed their tour of the Park August 23d, and had arranged to set out for home early on the following morning.

In order to understand the unfortunate turn which the affairs of these two tourist parties were about to take, it will be necessary to explain, in briefest outline, the cause and previous incidents of one of the most remarkable Indian campaigns in our history.

From the time of Lewis and Clark, the Nez Percé Indians had dwelt in what are now the States of Oregon, Washington, and Idaho. Their territory extended from the Salmon River on the south to the Pelouse River on the north, and from the Bitter Root Mountains westward into the present States of Idaho and Washington. In 1855 they ceded to the United States a part of their territory, and the principal chiefs located in the several portions of

the remainder. In 1860, gold was discovered on the reservation and the usual gold rush followed. The danger of a conflict with the Indians became so great that a temporary arrangement, pending action by the government, was made between them and their Indian agent, opening a portion of the reservation "to the whites in common with the Indians for mining purposes."

But the settlers did not stop with these concessions. In defiance of law, they built the town of Lewiston on the reservation, and gave other proofs of their project for permanent occupancy. It soon became necessary for the government to take some decisive step, and this was accomplished in 1863 by a new treaty in which the Indians relinquished three of their most important valleys, the Wallowa, the Alpowai, and the Salmon River.

The treaty, however, was far from receiving the general assent of all the chiefs. A formidable faction, headed by Chiefs Joseph, Looking Glass, Big Thunder, White Bird, and others, refused to be bound by it, and were henceforth referred to in official reports as the "Non-treaty Nez Percés." For a time the authorities made no effort to enforce the new treaty, and the Indians were "tacitly permitted to roam" over their ancient hunting-grounds.

This condition of affairs continued for thirteen years, with various efforts in the meantime to arrive at some satisfactory settlement. Finally, in 1876, a civil and military commission was appointed to visit the Nez Percé Indians, to examine into their grievances, and to determine what measures were necessary for a permanent settlement of the question. The report* of this Commission is interesting, both for the facts it relates in regard to the tribal life and characteristics of the Nez Percé Indians, and for the

* See Report of Secretary of the Interior, 1877, part 1, p. 607.

Beaver Dam.

heroic treatment of the long-standing troubles which it recommends.

These Indians were altogether a peculiar people. The early missionaries had converted them to the Christian faith, and, whether from that cause, or from natural proclivity, they were among the most religious of our Indian tribes. There is a general concensus of authorities that, despite certain grave defects of character, they were, mentally and morally, far above the average Indian. In later times, approaching the period covered by this sketch, they fell under the influence of a class of mystics called "dreamers," who taught a doctrine of land ownership which was the immediate cause of all their subsequent troubles. This doctrine was, in substance, that "the 'Creative Power,' when He made the earth, made no marks, no lines of division or separation, upon it, and that it should be allowed to remain as it is;" that it "should not be disturbed by man, and that any cultivation of the soil, or other improvements, any voluntary submission to the control of government," were incompatible with the true purpose for which it was made. At bottom it was the broad principle that no man or aggregation of men can take from other men the right to enjoy what nature has made free for all. Why the Commission should characterize this doctrine as "pernicious," unless a thing is pernicious whenever it is impracticable, is not easy to understand. From the point of view of the nomadic life of the redmen, it is hard to conceive a theory of land tenure, or the want of it, more nearly approaching a perfect ideal.

Unfortunately for such a doctrine, at the point at which American history had now arrived, it was no longer possible of realization, and any attempt to put it in force could not result otherwise than in failure. So it was with

Joseph and his followers. The government for a long time overlooked their infractions of the Treaty of 1863, but finally was compelled to interfere. The Commission recommended that the existing treaty be enforced, by military aid if necessary. The recommendation was approved, and to General O. O. Howard fell the task of putting the Indians on their proper reservation.

For a time it seemed that they would be induced to submit without the employment of active force; but just as success was apparently assured, the Indians murdered some twenty white men, women and children, in revenge for one of their number killed the previous year. Peaceful negotiations came at once to an end, and the military authorities assumed control of the situation. This was June 13, 1877.

Between that date and July 12th, three battles were fought, in which both sides suffered severely, and the Indians displayed extraordinary fighting ability. They then left their country—as it proved, not to return—and set out across the mountains to their oft-visited "buffalo country," in the Judith Basin, far to the eastward of the Upper Missouri.

But their route lay too close to the military post of Fort Missoula and to the towns in the more thickly settled portions of Montana. They bore off to the southward, through a country with whose people they were well acquainted, and with whom they had often traded in previous excursions to the buffalo country. Here they found friends and obtained the supplies they needed.

In the meantime, General Gibbon, with a small force, which he had gathered from Forts Benton, Shaw, and Missoula, and from volunteers among Montana citizens, was in close pursuit. He overtook the Indians on the Big Hole

River, in Southwestern Montana, where a desperate battle ensued, in which his own force was severely handled.

The Indians then passed south into Idaho, with Howard in pursuit, swung around to the east, and recrossed into Montana by way of Henry Lake. Near Camas Creek they had an engagement with the pursuing troops.

Howard arrived at Henry Lake at 8 A. M., August 23d, just as the Indians had left. The long marches compelled him to halt at this point for three or four days, to rest his men and replenish his supplies. This gave the Indians a considerable start, of which, however, they took only a leisurely advantage. Their route lay across the Yellowstone Park, which they entered by Targhee Pass, and on the night of August 23d they encamped on the Firehole River, within the Park boundaries, a short distance from where we left the Radersburg tourists, and less than twenty miles from the camp of the Helena party. The interest of the campaign for the next week centers chiefly upon the fortunes of these unlucky excursionists. An account of their adventures will be given in the chapters immediately following.

Just as the Indians went into camp on the night of August 23d, their first day in the Park, they captured one Shively who was on his way to Montana from the Black Hills. As Shively professed to know the country, which the Nez Percés had never seen before, they impressed him into their service as guide. He was with them thirteen days and claims to have served them faithfully, as well as to have received fair treatment from them. At any rate he won their confidence by his behavior, and was watched so carelessly that he escaped one dark night just as the Indians were crossing the northeast boundary of the Park.

On the 24th of August the Indians, under Joseph, moved to the Yellowstone River at the site of the ford near Mud Geyser. Here they remained during the 25th. On the following day the bulk of the command crossed the river, ascended its right bank to the lake, and took the Pelican Creek trail for the Lamar River valley in the northeast corner of the Park. A small party of marauders separated from the main body at Mud Geyser, descended the Yellowstone by the Mt. Washburn trail, attacked the Helena tourist party on their way, killing one man, burned and partially destroyed Baronett bridge near the junction of the Yellowstone and Lamar Rivers, made a raid upon Mammoth Hot Springs, killing one man there, and went down the valley as far as Henderson's Ranch, where Cinnabar now stands. Here they committed numerous depredations, stole a number of horses, and then returned without having suffered any loss whatever.

Chief Joseph and his followers left the Park by way of Miller Creek. Their natural route would have been by Soda Butte Creek and Clark's Fork; but they had learned, probably through Shively, that there was a large party of miners in the section where Cooke City now stands, and they feared that they might encounter some opposition there.

As soon as the command at Henry Lake had become recuperated, the pursuit was vigorously resumed. Howard followed in the track of the Indians as far as to the ford of the Yellowstone; but instead of crossing at this point, he descended the river by the left bank to the site of Baronett's celebrated first bridge over the Yellowstone. The bridge was found partially destroyed by the Indians and had to be repaired, after which the line of march was continued up the Lamar and Soda Butte Valleys, and across the divide to the valley of Clark's Fork.

The authorities had been widely warned of the probable route of the Indians and were lying in wait to intercept them. Gen. Sturgis expected to do this as they emerged from the Absaroka Mountains; but unfortunately he stationed himself in the wrong pass and left the one which the Indians took unguarded. By this loss of time he fell in behind both the Indians and Howard, who was now in close pursuit. The Indians crossed the Yellowstone, September 12th. Here Sturgis overtook them with a company of cavalry and a slight conflict ensued. The Indians then struck north, apparently for the British line. On September 23d they crossed the Missouri at Cow Island and resumed their march north. But they were intercepted by General Miles in the Bear Paw Mountains and a severe fight followed, at the northern base of the range on Snake Creek, less than thirty miles from the boundary. The Indians were defeated and Looking Glass was killed. Most of the survivors surrendered unconditionally, and the rest escaped across the line. This was on October 5, 1877.

Since the first outbreak, June 13th, three months and twenty-two days had elapsed. The flight and pursuit had extended over 1,500 miles. There had been no fewer than fifteen engagements. The whites had lost 6 officers and 121 soldiers and citizens killed, and 13 officers and 127 soldiers and citizens wounded. A large part of the Indian losses could never be ascertained, but their known losses were 151 killed, 88 wounded and 489 captured.

This celebrated campaign is well intended to elicit the fullest sympathy for the unfortunate Nez Percés. A vast deal of sentiment has been wasted upon the cause of the red man. Opinions have ranged from the extreme views of Catlin, who could see no wrong in the Indian, to those

of the rabid frontiersman whose creed was "no good Indian but a dead one." But, if there ever was a case where sympathy might well incline to the side of the Indian, it is the one under consideration.

The Nez Percés had always been friendly to the whites, and it was their boast that they had never slain a white man. They were intelligent, brave, and humane. In this campaign they bought supplies which they might have confiscated; they saved property which they might have destroyed; they spared hundreds of lives which other Indians would have sacrificed. If some of the more lawless element committed various outrages, they might justly reply that the whites had fired into their tents where their women and children were sleeping. In short, their conduct in this campaign places them in all respects nearer the standard of civilized people than any other of the native tribes of the continent.

In estimating the causes that led to the war, history can not fail to establish that the Indians were in the right. It was a last desperate stand against the inevitable destiny which was robbing the Indian of his empire; a final protest against the intolerable encroachments of the pale face. In defense of this principle, the Nez Percés staked their all on a single throw. They lost, and were irretrievably ruined. They were transported to a distant territory, and the land of their fathers they saw no more.*

The campaign of 1877 was the only one in which tourists of the National Park were ever subjected to serious

* After the surrender, Joseph and a few of his followers were sent to Fort Leavenworth, where they remained until July, 1878, when they were taken to the Indian Territory. After languishing here for seven years, they were established on the Colville Reservation in Washington.

danger from the Indians.* It has left its mark indelibly upon the Park. "Nez Percé Creek" will always remind the traveler of the terrible danger in which another party of tourists was once placed upon the borders of that stream. "Howard's Trail" will not soon be effaced from the forests and mountains where Captain Spurgin, with brilliant expedition, built the first passable highway through that tangled wilderness.

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* In 1878, there was a slight alarm in the Park caused by an ephemeral raid of the Bannock Indians; but, beyond the loss of a few horses, no damage was done.

CHAPTER XVI.

THE NEZ PERCES AND THE RADERSBURG TOURISTS.

Going back to the morning of August 24, when Chief Joseph and his people arrived in the Lower Geyser Basin, we will record the experience of the two parties of tourists to whom allusion was made in the previous chapter. The Radersburg tourists were encamped about half a mile west of the Fountain Geyser in a fringe of trees along the left bank of a small stream. This had been their permanent camp from which they had made excursions to the Upper Basin, the Lake and the Cañon. Arnold and Dingee had arisen before sunrise to make a fire and prepare breakfast, for the party were to start home that morning. Soon after, Mrs. Cowan aroused her husband and told him there were Indians outside. Mr. Cowan peered through the flap of the tent and saw that it was indeed so. Hastily dressing, he went out and commenced talking with an Indian called Charley, who spoke English well—a tall, slender Indian, with a long, but not bad-looking face. Charley pretended that the Indians were Flatheads, but a little questioning drew out the fact that they were Nez Percés. As it was known that these Indians were on the warpath, Mr. Cowan at once realized the gravity of the situation in which his little party were placed.

Charley pretended that he belonged to Looking Glass' band, who, he said, were friendly; and that the hostiles, under Chief Joseph, were "two sleeps" in rear. Cowan told him where he was from and that his party were just about

to start home. Charley replied that it would not be safe to go back for he would meet Joseph's men, who would kill the entire party. Looking Glass, he said, was *en route* to the Yellowstone buffalo country, and it would be better to go along with that chief. Cowan told him that he could not go that way, and that he would take his chances with Chief Joseph's men. Just at that moment he saw a number of Indians crowding around the baggage wagon and Arnold on the point of handing them out supplies. He promptly elbowed his way through the crowd and ordered Arnold not to give away any of the provisions. This vigorous action incensed the Indians, and probably accounts for their persistent efforts to kill Cowan later in the day.

By this time the Indians had collected in large numbers and Cowan became thoroughly alarmed. He ordered the teams hitched up and camp to be broken at once. Everything was soon ready. There was a double-seated covered spring wagon, and a half spring baggage wagon. Such of the party as could not find seats in the wagons rode saddle horses. Cowan ordered the drivers to pull out, and he himself mounted his horse and rode alongside the wagon in which his wife was seated. The two women were crying, for the situation seemed to them hopeless. The start was made and the little stream crossed, when the wagons came to an abrupt stop. Directly in front was a line of mounted warriors, like a platoon of cavalry, with guns against the thigh as if ready for action, completely blocking the way.

To this time Cowan had believed what Charley had told him about the chiefs—that Looking Glass was ahead and Joseph some distance back. Charley had tried to get Cowan to go on ahead, saying that Looking Glass wanted to see him; but Cowan had refused. Carpenter did go

on until he discovered the ruse, and did not rejoin the party for an hour or so after.

When Cowan saw his way barricaded he demanded of Charley the cause, and insisted, with considerable vehemence, that the Indians must get out of his way. Charley smiled with a satisfied air, but made no reply. Cowan repeated his demand. Just then an Indian approached from the rear, put up his hand, gave some command in the native tongue, and the Indians lowered their guns. Cowan thought that this must be some chief of authority and promptly addressed his demand to him. This Indian, also smiling and pleasant, looked Cowan straight in the eye, but said nothing. Cowan pressed his demand, whereupon Looking Glass (for it was this chief) pointed backward with the thumb of his left hand to an Indian a little to his left and rear, and said in a heavy, dignified tone: "Him, Joseph!"

Here, then, was a situation. Cowan was "up against" Chief Joseph himself, and Looking Glass and the whole Nez Percé army. Joseph was painted in vermilion, but Looking Glass not. Joseph was the better looking man of the two. Cowan did not hesitate, but carried his petition promptly and unfalteringly to the throne itself. Joseph looked him straight in the eye, but never deigned a word. Charley then came up and said to Cowan: "Look here, now; we're going to take your party right along." Cowan protested, but Charley made no reply except to order the party to move on.*

Forced to accompany the army of Chief Joseph, the hapless party felt that their hopes of escape were slender and

* While talking with Charley before breaking camp, the Fountain Geyser played. Charley pointed toward it and said to Cowan: "What makes that?"

that they would all be massacred at the first favorable opportunity. They were wretchedly armed and could offer no effective resistance. They moved on up the valley of Nez Percé Creek, and when about a mile and a half above the present bridge were stopped by the timber. Charley ordered the wagons abandoned, and the passengers to mount the horses. The provisions were all confiscated and the spokes cut out of the wheels of the spring wagon. Charley rushed matters and in a little while the party were again on their way.

Nothing of importance transpired on the march up Nez Percé Creek, and the noon camp of the Indians was reached in a beautiful spot in the edge of the timber at the foot of Mary Mountain. The party were ordered to dismount. Off a little to one side were the squaws preparing something to eat. The chiefs and some other principal men were seated in a half circle in a lovely little grass-covered opening among the trees and it was evident that a council was to be held to decide the fate of the party. In fact, the council commenced at once, an Indian by the name of Poker Poe acting as spokesman for the chiefs, who could not speak English. Cowan answered for his party.

Poker Joe opened up by asking several questions about where the party were from, the purpose of their visit and where they desired to go. He said that he had known Cowan's wife and sister and their brother, Carpenter, whom he had often seen at the Spokane House fifteen miles southeast of Helena, near the old trail by which his people went to the buffalo country in the Judith Basin. He spoke of the battle of the Bighole, where they had lost many warriors, and even women and children. He said their men were very angry and thirsty for revenge, but

that it was not their desire to injure Montana people, but only Lewiston soldiers. They were in need of guns and horses and all kinds of supplies. The chiefs had decided to take the horses and firearms of the party, and give them broken down horses and let them go home. This was their only salvation; otherwise all would be killed.

To this deliberate ultimatum there was evidently only one reply—acceptance. Resistance was utterly out of the question. The proposition of the chiefs gave at least a hope, slender though it was, and after consultation with his party, Cowan gave his consent.

The council at once broke up and the Indians made a rush for the confiscated outfit. Cowan's horse fell to Poker Joe, who was thrown to the ground by the angry animal in attempting to mount him from the right side. Poker Joe then made a circuit of the camp, calling out some command in the Indian tongue. The squaws immediately commenced packing up. A few minutes later he repeated the command, and then a third time, after the same interval. The whole camp then moved up the trail. Poker Joe told the captives that they were free and directed them to take the back trail. They started back entirely alone. To this time they had not suffered the slightest indignity from the Indians.

After retreating some three-quarters of a mile, a party of about seventy-five Indians came galloping back uttering warwhoops, and evidently bent upon mischief. They ordered the little party to stop, and Charley (who again appears on the scene) asked, in apparent anger, what had become of two of the men who had discreetly taken to the brush. Cowan replied that he did not know before that they were gone. After a little delay the party were countermarched and taken back up the trail. It was evident

that their situation was now a desperate one. An occasional stop was made to give the Indians time for consultation. The party proceeded back past the council ground and perhaps three-quarters of a mile beyond, when two Indians were sent on in great haste, with the probable purpose of finding out if the chiefs were at a safe distance ahead. A few minutes later, as the party were passing over a little knoll, these two Indians came riding back at full speed. Seeing the party they stopped, and one of the Indians fired at Mr. Cowan, striking him in the right thigh. The firing then became general and the party scattered into the woods. Carpenter and his two sisters were taken prisoners. Carpenter's life was saved by an involuntary act which has won for him the undeserved credit of showing great presence of mind. An Indian leveled his gun at him, when Carpenter, believing that his time had come, made a sign of the cross. The religious nature of the Indian* instantly responded to the familiar movement, and he dropped his gun and told Carpenter that he would save him.

When Cowan was shot he slid from his horse, but his leg was paralyzed and he fell upon the steep side hill and rolled down against a log. Mrs. Cowan instantly leaped from her horse, ran to her husband's side, enveloped his head in her arms, and tried to baffle the efforts of the Indians to kill him. The Indians tried to pull her away, but she resisted strenuously, begging them to kill her instead. Cowan himself held fast to her, preferring that she be killed there with him than be left to the mercy of the savages. Charley then came up, asked where Cowan's wound was, and seeing that it was not fatal, made a desperate

* The Nez Percés had been for nearly fifty years devout followers of the Catholic Church.

effort to get a shot at his head, but Mrs. Cowan was too alert for him. Finally, Charley drew Mrs. Cowan back and another Indian held a pistol almost in Cowan's eyes and fired. Mrs. Cowan was pulled away, and with her brother and sister was taken along with the Indians. Some stones were thrown upon Cowan's head, and he was then left for dead.

Singularly enough, neither the bullet wounds nor the blows from the stones had been fatal to Mr. Cowan and he presently recovered consciousness. The attack had taken place about 2:30 P. M., and when he opened his eyes the sun was just dropping below the western hills. He recalled what had happened, examined himself, made up his mind that there was abundant hope yet, and concluded to save himself if he could. He drew himself up by the branch of a tree, when, lo! a little way off, he saw a mounted Indian in the act of drawing his rifle to fire at him. Cowan tried to get away, but the Indian dismounted and fired and struck him in the back. He fell to the ground and momentarily expected the Indian to come up and dispatch him, but for some reason he did not come.

After waiting awhile, and seeing no other Indians, Mr. Cowan commenced a pilgrimage on his knees which continued for several days and probably has no parallel in history. He was wholly without food, with three bullet wounds and dangerous bruises on his person, and in a trail that was still thronging with hostile Indians. He crawled along on the back trail in a bright moonlight until about midnight, when he thought he saw something. Stopping and looking closely, he saw an Indian rise up from his sleep, look around and then lie down again. Cowan retreated as noiselessly as possible, made a wide detour, and resumed his course. He next passed a bunch of broken

down Nez Percé horses, which has been abandoned. He would have caught one, but there was no bridle and it was doubtful if he could have ridden. It was not until noon of the following day that he reached a creek crossing and found plenty of water.

At this snail pace Cowan kept on day after day. One morning, about nine o'clock, he heard Indians again. Lying low behind a tree he watched and listened, and presently saw a body of about seventy-five Indians passing up the valley. He thought he saw a white man among them, but was not certain. It was, in fact, a company of friendly Bannock scouts on the trail of the Nez Percés, under the command of an army officer. But Cowan did not know and it would not do to run any risk.

The day after this event he reached the abandoned wagons. There was nothing to be found there in the shape of food, but he did find a bird dog that belonged to the party. The dog had probably been there ever since the wagons were abandoned. At the first sight of Cowan she rushed at him fiercely, but suddenly recognizing him, her fury changed and she pawed and caressed him in a paroxysm of joy.

Cowan next made his painful way to the old camp, where he found about a dozen matches and a little coffee scattered on the ground. With an old fruit can he succeeded, after much difficulty, in making some coffee—the first thing he had had in the way of nourishment since he was shot. Remaining there over night, he started for the valley of Nez Percé Creek, because he would there be more in the route of any force that might be following the Indians. When nearing a point which he had selected for his permanent bivouac, he discovered two horsemen on the edge of some timber and presently distinguished that they

were white men. He signaled and they approached, inquiring in much astonishment, "Who in h—l are you?" Cowan gave them his name and they replied that they had expected to bury him that day. They had met Oldham and Meyers, who had told them that Cowan was dead. The two men were scouts from Howard's command. They fixed Cowan up as well as they could, built him a large fire, left him food to last till Howard should come, and then went on their way.

Cowan dropped asleep, but soon fell into another peril which came near proving fatal. The ground on which he was lying was full of vegetable mould, very dry at that season of the year, and the fire burrowed through it with facility. Cowan was awakened by the heat and found himself completely surrounded by fire. With great difficulty and severe burns, he extricated himself from this new danger.

Howard and his command came along on the afternoon of August 30th, and went into camp half a mile above the present bridge over Nez Percé Creek. He named this camp "Camp Cowan." He brought news of the safety of Mrs. Cowan and her sister and brother. Cowan was given surgical attendance, and when camp moved was carried in one of the wagons. He accompanied General Howard's command as far as to Mud Geyser, and was then entrusted to the wagon train in charge of Captain Spurgin. After many delays and great suffering, he reached Bottler's ranch about twenty-five miles north of the Park, a great stopping place in those days. Here the military left him to await the arrival of friends.

Mrs. Cowan in the meanwhile had returned home. She remained there but one day, when she went to her father's house some twenty miles distant and there received news

of Mr. Cowan's safety. She at once went to Helena to learn by telegraph where he was, and then went by stage to Bozeman, where she procured a suitable conveyance and started for Bottler's ranch. The day after her arrival they set out on the return journey to Bozeman, Mr. Cowan lying on a bed in the bottom of the wagon. The route lay across the Trail Creek divide between the Yellowstone and Gallatin Rivers. When near the top of his divide, and going down a steep hill, the neck yoke broke, the team ran, and the wagon was overturned down the mountain side. Only the generous supply of bedding on which Mr. Cowan was lying saved him from serious injury. By good luck a man on horseback happened along just then. Arnold impressed the horse, made a forced ride to Fort Ellis, secured an ambulance, and the journey was thus completed to Bozeman. Cowan was taken at once to a hotel, where he remained until well enough to return home.

The fatality which seemed to pursue Mr. Cowan did not yet desert him, but now began to assume a ludicrous phase. As soon as his presence at the hotel became known, friends and others rushed in to see him and tender their congratulations. They gathered around his bed and so many sat down upon it that it gave away and fell in a wreck on the floor. The proprietor jokingly threatened to expel the wounded man, as he could not afford to have such a Jonah on the premises.

Among the callers upon Mr. Cowan at this time was an importunate minister who displayed some of the tactless zeal which occasionally characterizes members of the clerical profession. He asked many questions, which Mr. Cowan, in his exhausted condition, became very tired of. Finally he said with impressive gravity: "Mr. Cowan, during all this time that you were crawling along, not know-

ing that you would ever see your friends again, did you not frequently think of your God?" Mr. Cowan's patience was gone, and he replied in a way that he has ever since been a little sorry for: "Not by a d—n sight; I had too many other things to think of."

The experiences of Mrs. Cowan and her sister, after the events of August 24, though full of hardship and suffering, were not at any time a matter of peril. They were treated with respect by the Indians. A council was held at the ford of the Yellowstone to determine their fate, and they were given their freedom. Their long ride to Bottler's ranch was very trying, but they accomplished it successfully.*

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* Mr. and Mrs. Cowan are still living at the date of this writing (1903). They have made several tours of the Park since their first unhappy visit. In 1901 Mr. Cowan accompanied the writer on an expedition over the route of Joseph and Howard and rendered material aid in identifying the more important landmarks of the campaign.

CHAPTER XVII.

THE NEZ PERCES AND THE HELENA TOURISTS.

The party of Helena tourists in camp near the Falls of the Yellowstone on the night of August 24th, were less fortunate than the Radersburg party. On the morning of the 25th, they started up the river toward the Mud Geyser. They had gone about a mile beyond Sulphur Mountain when they discovered moving bodies of men, part of whom were fording the river. Careful scrutiny showed them to be Indians, and the party rightly divined that they must be the hostile Nez Percés. They hastily retraced their steps and went into camp in the timber near the forks of Otter Creek, about a mile and a half from the Upper Falls of the Yellowstone. Here they remained undisturbed all day and the following night. On the morning of the 26th, Weikert and Wilkie set out to scout the country. They went as far as Sulphur Mountain, and finding everything clear, started back to camp to report. When entering the timber just north of Alum Creek, they suddenly met a band of Indians who promptly opened fire on them. A flight and pursuit of considerable duration ended in the escape of both men; but not until Weikert had been wounded. This party of Indians had just attacked and dispersed the group in camp. They had stolen upon the camp as dinner was being prepared, and a volley of musketry was the first warning the tourists had of their presence. There was instant flight, and most of the party managed to get away. But Kenck was soon overtaken and killed; and Stewart, after being severely wounded, prevailed on the Indians to spare his life.

Weikert and Wilkie, who had hastened back to camp after their own encounter, found everything in confusion, and all the party gone. They soon fell in with several of them, and together they set out for Mammoth Hot Springs.

And now began another series of wanderings through the trackless wilderness of the Park. Two of the party made their way by way of the Madison River, where they were given food by soldiers, to Virginia City and thence to Helena. The rest of the survivors, after much hardship, reached Mammoth Hot Springs, and soon after left the Park with the exception of Weikert, Dietrich, the colored cook, Stone, and a man named Stoner.

On August 31st, Weikert and one McCartney, owner of the first hotel ever built in the Park, went to the Falls of the Yellowstone in order, if possible, to learn the fate of the missing members of the party. Shortly after their departure from the Springs a band of Indians prowled across the country from the Yellowstone to the Gardiner, and went down the latter stream as far as Henderson's ranch near the present town of Cinnabar. After a brief skirmish and a general pillage here, they went back to Mammoth Hot Springs. Stoner and the colored cook fled precipitately, but Dietrich, believing the Indians to be friendly scouts, remained behind and was shot dead in the door of the hotel. Stone made a lucky escape by climbing a tree, and his subsequent ludicrous recital of his experience became a standing jest among the inhabitants of the Yellowstone.

Weikert and McCartney went back to the old camp on Otter Creek, where they buried Kenck's remains and gathered up whatever of value the Indians had left. On their way back, when near the falls of the East Gardiner, they met the band of Indians who had just slain Dietrich at

The Devil's Inkstand.

Mammoth Hot Springs. A lively skirmish ensued, in which Weikert lost his horse. The two men succeeded in finding refuge in some neighboring brushwood.

Several noteworthy incidents are connected with this raid of the Nez Percés, as there always are with any event where human life is at stake and men are put upon their mettle by the problem of self-preservation.

The camp site on Otter Creek was well chosen for defense, but its natural advantages were absolutely ignored by the party. It was a triangular knoll between the forks of the stream, and some twenty feet above them. It commanded every approach, and with the slightest vigilance and intelligent preparation, could have been made impregnable to the eighteen Indians who attacked it. But while the camp was properly pitched in a little depression back of the crest, the men themselves all staid back where the view around them was entirely cut off. They kept no guard, and were, therefore, in a worse position than if actually out in the open plain below. The Indians approached under cover of the hill, climbed its sides, and burst over its crest directly into camp before any one suspected their presence.

When the Helena party retreated from Sulphur Mountain, after their first sight of the Indians, Kenck wanted to go right in to Mammoth Hot Springs, instead of going into camp as they did on Otter Creek. He even refused to submit to the decision of the majority and started back alone, but gave it up and rejoined the party. Shortly before the attack occurred, his mind full of foreboding, he said to Stone, the colored cook: "Stone, what would you do if the Indians should jump us?" Stone replied: "You take care of yourself, and I'll take care of mine." Scarcely were the words out of his mouth when the Indians did

"jump" the camp. Stone took care of himself, as he had promised, and as we shall presently see, but poor Kenck was chased to a hill across the creek and there slain.

Stewart's escape was due to an impulse of mercy or indulgence very rare in the annals of Indian warfare. He was hit with a rifle ball in the first rush to escape. He fell and the Indians came up and he expected to be dispatched at once. He begged lustily for his life and promised to give the Indians everything he possessed—a rather superfluous generosity, since they could take it all anyway. His pleading seemed to make an impression. He gave them two hundred and sixty dollars in cash and his gold watch, and they let him go. Just after they left he saw his horse near by. The animal was incorrigibly wild and very hard to catch; but this time responded at once to its master's voice and gave himself up without any apparent objection.

Weikert's and McCartney's brush with the Indians on the slope of Mount Everts was a lively affair while it lasted. Both men spurred their horses up the steep side of the mountain toward some underbrush, the Indians firing thick and fast all the time. The two men replied, but not very effectively at the speed at which they were going. Suddenly both were unhorsed. Weikert's horse was shot and instantly killed, and McCartney's saddle slipped back and turned over under the horse, frightening him and causing him to run away. The mule that carried the pack was abandoned when the chase began. The Indians were getting very close when the two men reached cover, but then abandoned the chase and themselves took counsel as to their personal safety.

Once during their flight McCartney looked at Weikert and saw that he was pale as a sheet. He said to Weikert,

"Do I look pale?" "No, do I?" McCartney answered, "No."

Just how Dietrich happened to get caught as he did is a mystery. He was a music teacher from Helena and unused to roughing it. On his way in from Otter Creek he became utterly exhausted and a horse had to be sent back several miles for him. When Weikert and McCartney started back to bury Kenck, McCartney cautioned him to "look out for his hair." Dietrich replied: "Andy, [Weikert] you will give me a decent burial, won't you?" Later in the same day Indians were seen approaching the Springs. They went on, however, to Henderson's ranch below and returned the following day. This time they apparently surprised Dietrich in the cabin, which still stands in the gulch west of Liberty Cap, and shot him on the door steps. The soldiers found the body soon after and laid it in the cabin on the floor. It was buried by Weikert on the following day. Six weeks later Weikert came in from Helena and took away the remains of both Kenck and Dietrich.

Ben Stone, the colored cook, no longer a young man, possessed enough of the quaint humor of his race to lend an air of comicality to a situation which more than once came near having tragic consequences. When the Indians "jumped" the camp on Otter Creek, just after he had made his laconic reply to Kenck, he could not at first believe it was Indians, but thought it was some of his own party trying to create a little excitement. He called out to them to "stop their foolishness," for they might kill some one, and added, "You can't scare us." A moment later saw him on a lively run and the dinner he was cooking was never finished. As he ran, the Indians fired several shots at him. He fell into a creek and they probably thought him killed.

Later, when Weikert overtook him on the trail and asked him how he got his trousers torn so (there was a ragged rent across the seat) he replied: "Oh, I know where I got that. It was when I fell. I recollect feeling as if something were crawling under me and it was a piece of lead."

Stone was at Mammoth Hot Springs when the Indians raided the place. He retreated up the gulch back of the McCartney cabin, the Indians in pursuit, and taking advantage of a moment when a turn in the trail concealed them from view, shinned up a tree and made himself scarce in the branches. His heart beat so loud that he was certain the Indians would hear it. One of them did stop directly under the tree, but the terrified cook prayed fervently that he might pass on, and his prayer was answered.

Weikert, in his Journal, records that Stone remained in the tree until after dark, "when he slipped down and crawled over a hill, where he stayed all night and the next day, when he again ventured out. Ben said, 'Five times I started out of dem bushes and five times I went back again. Then I prayed fervently to Almighty God to deliver me out of this trouble, and he did take me out.' A bear came to see him while he was in the brush and he was undecided what to do. If he stayed there the bear would be apt to eat him, and if he came out the Indians would be likely to kill him; but he finally decided in favor of the bear, because he had tried the Indians twice. When the bear saw him it stood up on its hind feet and looked at him for a while and then ran away"

The poor darkey then made his way to Henderson's ranch, where Lieutenant Doane was in camp with a company of scouts. The sentinel challenged him (Stone's version)—" 'Who comes dar?' 'Ben Stone.' 'Come in,

Ben Stone;' and you bet I come a runnin'." Two of the friendly Indian scouts rushed up to Stone and shook hands, exclaiming, "How, how!" Stone was again panic stricken and declared that one of the Indians was Chief Joseph himself. He did not recover his composure until Weikert and McCartney returned to camp.

That night his heart was so full of gratitude over his miraculous escape that he could not rest, and started to spend the night in praying aloud and thanking God for his goodness. The rest of the camp became weary of his devotions after a while and asked him to desist. He replied that God had saved his life and he was going to thank Him as long and loud as he liked, whether the camp got any sleep or not. Lieutenant Doane finally stationed a guard to compel him to silence.

CHAPTER XVIII.

CAPTAIN SPURGIN AND HIS "SKILLETS."

One of the interesting features of General Howard's pursuit of Chief Joseph across the Park was the part taken by Captain W. F. Spurgin, Twenty-first Infantry, who was engineer officer of the command.* Before starting on his long pursuit, General Howard organized in Idaho a company of fifty-two frontiersmen, all of whom were skilled in some useful kind of work. They were organized as a company of engineers, armed as infantry troops, but mounted on horses furnished by themselves, and were paid at the rate of three dollars a day and their rations. The company had two pontoon-boats, all necessary tools and supplies, and a large pack train. They were not designated as engineers, though doing the work of engineer troops, but as "skilled laborers." This long name was quickly condensed by the troops into "skillets." The company started out every morning half an hour after the

* "Captain William F. Spurgin, Twenty-first Infantry.—This officer performed important duty, first at the depot in Lewiston, and afterwards on the field in command of the Pioneer Company. His work in clearing the obstructed trails through the forests, and in making roads practicable for his bridge, wagons, and other impedimenta, over precipitous heights and yawning ravines, was often arduous in the extreme, and accomplished with extraordinary quickness. His labors were of such a character as to call forth energy, determination and skillful adaptation of the means to the end. All these qualities he displayed in a high degree, and succeeded in instilling the same into those under his command." Report of Gen. O. O. Howard on Nez Percés Campaign.

scouts, and about an hour before the main body. Their duty was to make a road for the army, and it involved constant work, great activity, and called forth every practical expedient for overcoming difficulties with alacrity.

After the Park was reached these difficulties became too great to open the road as fast as Howard wished to move, and on the second day the army passed on over Mary Mountain, leaving Spurgin and the train to follow as fast as they could. The Captain made the prodigious ascent of the mountain, opening a road through the timber, and reached the ford of the Yellowstone very soon after Howard did. The General asked him how many wagons he had to abandon, and was greatly pleased to learn that all had gotten through.

Captain Spurgin crossed to the right bank of the Yellowstone at the Mud Geyser Ford, as it was expected to follow the Indians up the Pelican Valley. But at this point a man named Irwin came into camp, who had just escaped from the Indians, and the information he brought induced General Howard to go down the Yellowstone by the left bank, cross at Baronett Bridge, and then ascend the Valley of Lamar River until he should strike Joseph's trail again. As the country was too rough for the wagons to keep up they were placed under separate escort, and supplies for the troops were carried by pack train. At Cascade Creek the escort was ordered to join Howard, and the train was put under charge of Captain Spurgin, with orders to take it back to Fort Ellis.

It was on this part of the route from Mud Geyser to Baronett Bridge, over the shoulder of Mt. Washburn, that Captain Spurgin made a proud record for himself as an officer of energy and resource, and left traces of the campaign through the Park which a quarter of a century

has failed to eradicate. There are evidences of the old road nearly all the way. The high wooded hill along the river west of the present road, and about two miles above the Upper Falls of the Yellowstone, was descended by cutting a narrow way through the timber and letting the wagons straight down, holding them with ropes wound around trees. The marks on the trees where the ropes burned through the bark are still (1903) distinctly visible. The soldiers called this place "Spurgin's Beaver Slide." The crossing of Cascade Creek also can still be identified.

The train passed through Dunraven Pass, and instead of keeping along the trail dropped down into the valley of Carnelian Creek. Thence it kept on to Tower Creek, and crossed the latter stream about a mile above the modern bridge. The traces of this old road will not disappear, except through a forest fire, for centuries to come.

While descending the valley of Carnelian Creek the little party had a momentary scare that created something of a panic. One of the herders rode into camp in hot haste saying that a large body of Indians was coming down the trail from Dunraven Pass. The men instantly withdrew a little distance from the train and took up a defensive position, where they waited an hour or so until all danger had passed. It developed later that the Indians were friendly scouts under Lieutenant Doane.

After arriving at Baronett Bridge, and when the difficult part of his task was over, Captain Spurgin decided to take with him only sufficient rations to carry him to Ellis, and send all the rest on to Howard by pack train. The circumstance gave rise to an amusing incident worth recording. There were three garrulous braggarts among Spurgin's "skillets," who were always vaunting the great exploits and the wonderful experiences they had gone

SODA BUTTE.

through. The night of the arrival at Baronett Bridge, Spurgin overheard them in camp engaged in their favorite pastime, each trying to outdo the other.

One of them related that when he crossed the plains with his father years before they found the game all gone, and were compelled to kill their horses for meat. They came to like this food almost as well as buffalo meat.

The second story teller declared that it was nothing to have to live on horseflesh; that he had often been reduced to such straits; and on one occasion had actually been compelled to live on rattlesnakes. He found this flesh exceedingly palatable, as good as anything he ever ate.

Number three likewise had been compelled in his long experience to eat everything from horses to snakes, and other reptiles and "varmints." But once he got into a country where he could find absolutely nothing. It was on the Blacktail Deer Creek, not very far from where they then were. He was about to give up in despair when all of a sudden he came upon a herd of strange wild cattle that weighed all the way from 1,200 to 1,800 pounds. He pitched his camp in this paradise, which had so suddenly sprung up in the desert, and reveled in abundance for several days.

The morning following this wordy contest Captain Spurgin called these men to his tent, told them his plans, and asked them how many days' rations they thought would be barely sufficient to take him to Ellis; that he wanted to send all the rest to Howard. The horseflesh eater thought about twenty days' rations would do. The rattlesnake man thought it best to make it twenty-one. The hero of the wild cattle tale "allowed" that it would require twenty or twenty-one. Their unanimity of opinion was striking, and their determination to have plenty to eat equally so.

Spurgin told them that he should take only seven days' rations. They threw up their hands in horror and declared that they would all surely starve. "Well," said the Captain, looking at number one, "if worse comes to worst we can kill our horses and eat them." The man replied that their horses were too poor to make suitable meat. "In that case we can fall back upon rattlesnakes," suggested the Captain. "There are plenty of them in this country, are there not?" and he fixed a mischievous eye upon the rattlesnake man. The latter promptly replied that rattlesnakes did not flourish in such high altitudes. "Well, in any event," persisted the Captain, turning to number three, "we will kill some of those wild cattle on the Blacktail that weigh from 1,200 to 1,800 pounds, and put up meat enough to last us. We shall have to do something, for I'm going to take only seven days' rations."

"We'd better see who's around the next time we go to blowing," said the wild cattle man to his pals as they slunk away crestfallen at their interview.

PART II.—DESCRIPTIVE.

CHAPTER I.

BOUNDARIES AND TOPOGRAPHY.

At the time when the bill creating the Yellowstone Park was before Congress there had been no detailed survey of that region, and the boundaries, as specified in the bill, were to some extent random guesses. The exploring parties of 1870 and 1871 had seen all the more important points of interest. To include these in the proposed reservation, the framers of the bill passed two lines due east and west, one through the junction of the Yellowstone and Gardiner Rivers, and one through a point ten miles south of the most southerly point of the Yellowstone Lake; and two lines due north and south, one through a point ten miles east of the easternmost point of Yellowstone Lake, and one through a point fifteen miles west of the most westerly point of Shoshone (then called Madison) Lake. The nearly rectangular area thus resulting was found to lie mainly in the northwest corner of Wyoming, with narrow strips, two or three miles wide, overlapping into the Territories of Montana and Idaho. The mean dimensions of the Reservation were 61.8 miles by 53.6 miles, giving an area of 3,312.5 square miles.

Under Acts of Congress approved March 3, 1891, and June 4, 1897, authorizing the creation of forest reserves and the modification of boundaries of reserves already created, several such creations and changes have been

made in the country around the Park during the past twelve years. There are at present two such reserves on the borders of the Park—the Yellowstone Forest Reserve (proclamation of January 29, 1903), which is a consolidation, with some change, of the reserves previously created east and south of the Park; and the Madison Forest Reserve, which was newly created by proclamation of August 16, 1902. The territory thus set aside covers the entire eastern and southern boundaries of the Park, except that portion in the State of Idaho; and limited portions of the northern and western boundaries. The approximate areas reserved are:

The Yellowstone Reserve, 13,070 square miles.

The Madison Reserve, 1,270 square miles.

This makes, with the Park proper, a total area reserved from settlement of about 17,600 square miles.*

There have been many attempts to extend the Park boundaries so as to take in portions of the surrounding country now embraced in the forest reserves, particularly the region known as Jackson Hole. The time is now past, however, when this can be accomplished without a radical

* There is an exceedingly interesting historical reference to this region, in which there is a definition of boundaries which does great credit to the individual who made it. In a letter quoted elsewhere, the distinguished Jesuit missionary, Father DeSmet, writing in 1852, makes this statement: "I think that the most extraordinary spot in this respect [natural wonders], and perhaps the most marvelous of all the northern half of the continent, is in the very heart of the Rocky Mountains, between the 43d and 45th degrees of latitude, and the 109th and 111th degrees of longitude." Let the reader examine a map of Wyoming on which are represented the Yellowstone Park and the neighboring forest reserves, and note how closely their combined area agrees with that described by Father DeSmet.

change in the present policy of governing the Park. Settlement has already gained a foothold in the surrounding reserves which it would be difficult to uproot. The permanent exclusion of railroads from all parts of such an extensive territory is neither practicable nor desirable. The hunting of wild game throughout this region at certain seasons and under careful restrictions is eminently proper. In the Park itself it is very desirable to exclude all these things and it has been found practicable to do so. The policy should be carefully maintained, and the Park is the only place of like extent in the world where this is possible. It will fall by its own weight if extended too far.

The Indians, with that exquisite propriety which so often characterized their geographical nomenclature, called this larger region the "summit of the world"; and it is the summit of the world as they knew it—the top of the North American Continent. From out its forests and mountains great rivers descend in every direction to the sea. The Missouri River, through the Madison and Gallatin Forks, and the great tributaries, Yellowstone and Platte, flows down from these mountains. Likewise Green River, the principal tributary of the Colorado of the West, rises in the snows of these same hills, and its icy waters flow south until they reach the sea on the very border of the torrid zone. Finally the great southern branch of the Columbia, the Snake River, finds it sources interlaced with those of the streams just mentioned.

The vast importance of this region as a source of great river systems will be understood when it is remembered that each of these streams flows for fully a thousand miles through a country where agriculture is possible only by irrigation, and that their waters, if properly utilized, are capable of maintaining a population as great as that west

of the longitude of Omaha to-day. Surely, it is not only the "summit of the world," but a veritable fountain head of national life, and there is a natural harmony of relation in the fact that this entire region has been brought under federal control.

MOUNTAIN SYSTEMS.

Confining our inquiries to the Park proper, we shall next note its salient topographical features. The Park lies in the "heart of the Rocky Mountains," and within or around it are some of the most massive ranges on the continent. This is particularly true of the extensive system which borders the Park on the east under the name Absaroka. It extends north of the Park fully forty miles and south as far as Union Pass, where it merges into the noted Wind River range. It separates the valley of the Upper Yellowstone from its principal tributary, the Big Horn. The range is excessively rugged and broken, and is practically impassable, except along a few trails. Sylvan Pass, which has been selected for the eastern approach to the Park, is about eight thousand six hundred feet high, nearly a thousand feet lower than any other within a distance of forty miles. There are thirty named peaks of this range within the Park with a ruling altitude of about ten thousand four hundred feet; but in the forest reserve, just east of the Park, the altitude is about two thousand feet higher. The scenery of these mountains is everywhere of a sublime and imposing character.

The Gallatin Range, another important mountain system, lies in and beyond the northwest corner of the Park. It separates the watersheds of the Missouri and Yellowstone Rivers, and is the source of several tributaries of each stream. The range is one of great scenic beauty and one

that falls prominently under the eye of the tourist. It is also of particular interest to scientists from its varied geological structure. It is not a lofty range, its seventeen named peaks, averaging only about nine thousand eight hundred feet high; but its highest summit, Electric Peak, is the loftiest mountain in the Park.

The Washburn Range, a detached system, originally known as the "Elephant's Back," is situated between the Grand Cañon of the Yellowstone and the Gardiner River. It has seven christened summits, with an average altitude of 9,800 feet. The most conspicuous peak of the range, as well as the most noted mountain of the Park, is Mt. Washburn.

The Red Mountain Range is a small group of mountains between Heart and Lewis Lakes, and southwest of Yellowstone Lake. Its principal summit, and next to Mt. Washburn the most important one in the Park, is Mt Sheridan.

The Big Game Ridge lies along the south boundary of the Park, and is the source of the Snake River. It has six named peaks, with an average altitude of 9,800 feet.

The Teton Range lies south of the Park, its northern spurs crossing the boundary. It is not an extensive system, but one of great altitude and marvelous scenic beauty. The Grand Teton, its principal summit, is about 13,700 feet high. The whole range rises in sheer relief above the surface of Jackson Lake nearly a mile and a half. It has always been a matter of great regret that this wonderful mountain system was not included in the Park.

The Continental Divide, or the "height of land," which separates the waters that flow into the Atlantic from those that flow into the Pacific, crosses the Park in a direction from northwest to southeast. Its sinuous course can be best understood from the map. It does not lie along the

crest of any prominent ridge, and in one place is but little higher than the Yellowstone Lake. A notable feature of the Divide is the great loop that it makes around the watershed of DeLacy Creek, a tributary of Shoshone Lake. The main tourist route passes directly through this area, and thus crosses the Continental Divide twice. Another prominent feature of the Divide is Two-Ocean Pass, described elsewhere,* which lies just south of the Park.

DRAINAGE SYSTEMS.

The Absaroka and Gallatin Ranges and the Continental Divide mark the boundaries of the three great river systems of the Park, the Yellowstone, the Missouri and the Snake.

The first two are on the Atlantic slope; the third is on the Pacific slope. The areas drained by them are approximately:

By the Yellowstone, 1,900 square miles.

By the Missouri, 730 square miles.

By the Snake, 682 square miles.

The Yellowstone River has its source in the snow drifts of Yount Peak, twenty-five miles southeast of the Park. It enters the Reservation six miles west of the southeast corner; crosses it in a direction somewhat west of north, and leaves it at a point about nineteen miles east of the northwest corner. Near the center of the Park it flows through the celebrated lake of the same name, and further north passes through two remarkable cañons before it leaves the Reservation. Its principal tributaries from the east are Pelican Creek, which flows into the Lake, and the Lamar River, commonly called the East Fork. Those from the west are Tower Creek and Gardiner River.

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* Page 310.

The Lamar River rises nearly due east of the outlet of Yellowstone Lake and flows northwesterly, joining the main stream near Junction Butte. Its principal tributary is Soda Butte Creek, which rises just outside the northeast corner of the Park and joins the Lamar River near the extinct hot spring cone from which it derives its name.

Gardiner River is the second largest tributary of the Yellowstone, and drains the extensive area between the Washburn and Gallatin Mountains.

The low-water discharge of the Yellowstone River, as measured by the writer, in 1891, a little below the lake outlet, is 1,598 cubic feet per second; as measured by the United States Geological Survey, in 1886, 1,525 cubic feet. The discharge at the north boundary of the Park cannot be less than 2,000 cubic feet.

The Missouri River drainage flows into the Gallatin and Madison forks of that stream. The Gallatin drains only a small area in the extreme northwest corner of the Park. The Madison is formed by the junction of the Gibbon and Firehole Rivers, about twelve miles east of the west boundary of the Park. The Gibbon takes its rise a few miles west of the Falls of the Yellowstone, and flows in a southwest direction. The Firehole rises in Madison Lake, and flows north to its junction with the Gibbon. Its principal tributaries are the Little Firehole River and Iron Creek on the west, and Nez Percé Creek on the east.

The Snake River drains the southwest portion of the Park. It rises about fifteen miles south of Yellowstone Lake, just outside the boundary. It then takes a northerly circuit into the Park, receiving the waters of Heart and Lewis Rivers, and leaves the Reservation just north of Jackson Lake. Its principal tributary is the Lewis River, which drains Shoshone and Lewis Lakes. Several large streams,

Bechler and Falls Rivers among them, cross the southwest boundary of the Park and join the main Snake further south.

A very noted stream, the main trunk of which lies outside the Park, is the Shoshone (formerly called Stinking Water) River, which rises in the Forest Reserve east of the Park. Several of its western tributaries, like Jones and Middle Creeks, drain a considerable area in the Absaroka Range, east of the lake; and along the valley of the second of these streams is located the eastern entrance to the Park.

These several rivers, with their tributaries, make about 165 named streams in the Park. The abundance of flowing water as indicated by these figures, has an important bearing upon the practical side of the Park—considered as a pleasuring ground. The number of bridges and the damages from floods are a constant and heavy expense to the road system. On the other hand, the presence of so many streams, with the rapids and cataracts which abound upon most of them, forms one of the most attractive features of the landscape.

In the entire Park there are about thirty-six named lakes with a total area of nearly 165 square miles. Of these lakes, twenty-one, with an area of 143 square miles, are on the Yellowstone slope; eight, with an area of perhaps two square miles, are on the Missouri slope; and seven, with an area of about twenty square miles, are on the Snake River slope. The four principal lakes—Yellowstone, Shoshone, Lewis and Heart—are clustered near the Continental Divide at its lowest point, the first being on the Atlantic slope, and the others on the Pacific.

There are upon the various streams of the Park no fewer than twenty-five interesting waterfalls, where the streams descend from the plateau to the lower surrounding country.

VALLEYS.

Although the mountains are the prime factors in determining the topography of a country like the Yellowstone Park, they are, in a practical sense, of less importance than the valleys that lie between them and the streams of which they are the source. It is mainly in the valleys that the fauna of a region dwell, and that man carries on his work. In the Park it so happens that most of the characteristic attractions are also to be found there.

The valleys naturally fall under two broad divisions—open valleys and cañons. The largest and most important of the open valleys is that of the Yellowstone and Lamar Rivers, stretching from Mt. Washburn and Crescent Hill nearly to the east boundary of the Park. It is fully twenty-five miles long and five to ten broad. It is nearly all open country, with fine pasturage extending well up the sides of the mountains, forming an ideal grazing ground, where elk, deer and antelope roam in immense herds.

Hayden Valley, the second largest grassy tract in the Park, is that portion of the valley of the Upper Yellowstone which lies north of Mud Geyser. It is covered with rich grass and is a splendid summer grazing ground, but the snowfall of winter is too deep for animals to dig through to the turf.

Among the other open valleys of importance are Swan Lake Flat and Willow Park, in the valley of the Upper Gardiner; Elk Park and Gibbon Meadows, on the Gibbon River; the broad area of Pelican Valley; the Firehole Geyser Basins, more noted for their natural features than as a grazing country; and some open tracts around Shoshone and Lewis Lakes, and along the valley of Falls River.

Going outside the Park, the wonderful valley of Jackson Hole naturally arrests attention. It is an extensive region, generally open and of rolling terrane, though in some places flat and even as a floor; abounding in fine pasturage, and a natural home for game of all kinds. But its chief attraction lies in its marvelous natural beauty. It is traversed by the Snake River; dotted with several fine lakes, of which Jackson Lake is the largest, and surrounded by majestic mountain ranges. The Teton Range on the west is its most important scenic attraction. The name, Jackson Hole, applies strictly to the lower part of the valley below Jackson Lake.

Cañons are the narrow openings among the hills through which the water from the mountains finds its way to the lower country. There are very many of these. On the Yellowstone, above the Great Bend at Livingston, where the river finally leaves the mountains, there are four of these cañons, the first two of which are outside the Park. The fourth cañon begins about two miles above the Upper Falls and continues to Baronett Bridge, a distance of twenty-five miles. Its central portion is the world-renowned Grand Cañon of the Yellowstone.

The Gardiner River has two fine cañons that come to the notice of the tourist. The first of these is near the northern entrance to the Park. The second lies behind Bunsen Peak, and is of great depth, beauty and grandeur.

On the Gibbon River there is a small, but picturesque, cañon half a mile long, below Virginia Cascade, and another of great interest, extending for five miles below Gibbon Meadows.

On the Firehole River there are two small gorges, interesting mainly from the cascades and rapids of the river. One of them is where the tourist route first strikes the river

five miles below the Fountain Hotel, and the other is in the vicinity of Kepler Cascade, above the Upper Geyser Basin.

Spring Creek Cañon is a winding, sylvan valley, of very picturesque outline, through which Spring Creek flows in the last three miles of its course. It is traversed by the tourist route.

On the eastern approach Sylvan Pass is a very striking natural cut through the mountains, while the cañon of Middle Creek presents a remarkable scene of rugged, broken country, filled with dense forests, and traversed by a torrential mountain stream.

There are hundreds of cañons besides those mentioned, where streams like the Lamar River and its tributaries, and the Gallatin, Snake and Upper Yellowstone, flow out from their sources in the mountain snows. But few visitors are fortunate enough ever to see them, and their beauties will always remain in large part concealed from the general eye.

PLATEAUS.

A considerable portion of the Park area is composed of what may be termed plateaus, elevated tracts of land, not so high as the mountain ranges, but much higher than the valleys. Ordinarily, these are to be found along the divides between the larger streams. The more important are the Pitchstone Plateau, between the Snake River and the head waters of the Bechler and Falls Rivers, with a mean altitude of 8,500 feet; Highland Plateau, between the Yellowstone and the Madison Rivers, altitude 8,300 feet; Mirror Plateau, between the Yellowstone and the Lamar Rivers, altitude 9,000 feet; the Blacktail Deer Plateau, between the Yellowstone and the Gardiner, altitude 7,000 feet; and the Madison Plateau, west of the Lower Geyser Basin, altitude 8,300 feet.

SCENERY.

The mountain scenery of the Park is that of the Rocky Mountains in general, though not so rugged and imposing on the whole as may be found in Colorado or in the Sierra Nevada and Cascade Ranges on the Pacific Slope. Yet in its general details it is typical of the scenery of the central mountain region, and perhaps the most varied and beautiful of any. The writer can not better convey a general idea of it than by reproducing here a description prepared for a different purpose.*

"The physical aspect of the Rocky Mountains is altogether characteristic. The traveler who passes hurriedly through them on the modern railroad is liable to contrast unfavorably their grey color, severe outlines and barren slopes with the verdure-clad hillsides of the Eastern States. Not so he, who, like the ancient trapper, frequents their unaccustomed haunts, comes in close contact with their wild and picturesque details, and observes their varying moods with the changes of each day and the seasons of the year. This more intimate acquaintance discloses a wealth of beauty which the uniform green of the Eastern mountains does not possess, and it is said by reputable painters of natural scenery, that no mountains in the world, not even the Alps, afford scenes so satisfactory to the artist as those of the Rocky Mountains.

"The general appearance of the mountains is of a greyish color where vegetation is scarce. This results not only from the exposed areas of rock *in situ,* but from the disintegrated rock which covers the mountains in many places with a sterile soil. The reddish color of iron oxide is widely present, particularly in the smaller hills of the

*American Fur Trade of the Far West, p. 728 et seq.

Bad Lands, while yellow and other colors are of frequent occurrence.

"The greater number of the northern mountains have extensive grassy slopes whose broad areas, inclined upward as on a mighty easel, and spread out in rolling stretches with gentle depressions between them, look like beautiful carpets of green or brown, according to the season, softened by the mellow haze of distance and burnished by the crimson rays of the morning and evening sun. At the higher elevations, from five to ten thousand feet, forests of pine, fir and similar trees abound extensively and cover the mountains with a mantle of dark green or black. At frequent intervals throughout these forests are open spaces, filled with luxuriant grass, forming parks of faultless beauty amid the somber solitudes of the surrounding woods. Everywhere in these wild and sublime situations occur the always pleasing groves of the quaking aspen, a grateful relief either from the gloomy view of extensive forests or the uniform prospect of grass-covered slopes. Taken together, these varied arrangements of nature present an artistic appearance that reminds one of the cultivated sections in the mountain regions of Europe where man has contributed so much to enhance the beauty of nature.

"The scenery of these mountains, moveover, is subject to continual and interesting change. Scarcely have the bleak storms of winter subsided, and while yet deep fields of snow lie upon the upper slopes, the soft blossoms of spring shoot eagerly from the scanty soil and oppose the gentle warmth of their blooms to the chill snow which is slowly receding before them. So profuse and beautiful are the flowers in these lofty regions that one would doubt if any other season could rival the springtime in beauty. But in

truth the somber season of autumn is the most attractive of all. The early frosts cover the mountain sides with the most varied and gorgeous colors. The quaking aspen, which before was simply a mass of green upon the mountain side, now stands forth with tenfold greater distinctness in its rich autumnal foliage. The low growth of underbrush, which scarcely attracts the eye at other seasons, takes on a livelier hue, transforming whole mountain sides into fields of pleasing color. Even upon those inaccessible and apparently barren slopes, where the eye had not before detected any sign of vegetable life, may now be seen spots of crimson and gold, as if nature had scattered here and there rich bouquets of flowers and bunches of fruit.

"It is not upon the surface of the earth alone that are to be seen the grandeur and beauty of these regions. Even the wild mountain storms which are frequent at certain seasons have an attraction peculiarly their own, and all the more remarkable by the very contrasts which they produce. If, in passing, they display on a terrible scale the power of the elements, on the other hand, they leave behind them, in the sun-gilded clouds among the mountain tops, the most peaceful and pleasing pictures which nature anywhere affords.

"Again, in the long rainless season, the atmosphere, like the painter's brush, tints the hills, in ever-varying intensity, with the purple and blue of distance. For this is pre-eminently a land of cloudless skies. The risings and settings of the sun are on a scale of sublime magnificence, while the moon rides among the mountain peaks with a serene splendor unknown in less favored climes."

It is in this mountain scenery that the chief attraction of the Park lies—for him who spends considerable time there.

He may weary of the geysers and hot springs, but he always finds relief in the varied aspect of nature—her shifting seasons, her growth and decay; her mutability amid scenes of changeless grandeur—and it would make little difference in his fondness for this region if all its strange and erratic phenomena should cease to exist

CHAPTER II.

GEOLOGICAL HISTORY OF THE PARK.

Nature seems from the first to have designed this region for a mountain park. Back in the remote twilight of the earth's geological history, beyond which man is unable to trace the smallest relic of the past, and when the surface of the globe was one vast ocean with a few scattering islands, the nuclei of all subsequent land growths, there had already arisen around the Park country those granite protuberances which form the ground work of its present mountain systems. Just what were the position and extent of these primeval elevations can never be definitely determined, but geologists agree that they existed on every side of the Park which itself remained buried beneath the waters long ages after their emergence.

In the course of an inconceivable extent of time, embracing the Paleozoic and Mesozoic eras, these exposed areas were denuded by the action of the elements and the resulting detritus was spread about over the bottom of the surrounding seas. Not improbably chemical action, in those times of intense activity of all natural agencies, may have hastened deposition from the impregnated waters and have aided in the upbuilding of the sedimentary rocks. From whatever cause, these depositions were of vast extent, their thickness in some localities, as measured by the geologist, being several thousand feet. Possibly during all this time there was an increasing emergence of old mountain foundations, bringing the outlines of the continent more and more prominently into view.

In geological chronology it was near the close of the

Cretaceous Period that this long-existing condition underwent a profound change. The shrinkage of the earth in the process of cooling had thrown a strain upon its still weak and plastic crust which it was no longer able to withstand. The old Archæan rocks and the vast sedimentary accumulations were crumpled and forced upward in stupendous wrinkles, forming lofty mountain ranges above the ancient sea. These movements may have been very slow, as we now reckon time, but they were rapid in a geological sense.

Very interesting would it be if the geologist could penetrate the lavas which now cover these ancient rocks, and make for us a map of the Park region as it then was. We may conjecture that the present surrounding mountain chains had taken form, and were probably more lofty and very different in appearance, owing to the vast changes of later times. It is also probable that the interior of the Park, which we now call its plateau, had arisen above the sea and that consequently the formation of sedimentary rocks had ceased. The interior basin was nevertheless a depressed area, relatively far deeper than at present. Whether there were folds or uplifts where Mts. Washburn and Sheridan now stand is uncertain, but the feeble resistance of the crust at these points in later times would indicate that there were.

Now followed changes of great and far-reaching importance. The crushed and plicated earth-crust yielded to pressure from beneath, where the molten interior, compressed by the ever increasing force of contraction, was seeking relief and expansion. Volcanic eruptions of wide extent and prodigious magnitude took place, and continued intermittently through Tertiary and into Quaternary time. There were evidently many and long periods of quiescence.

The pent-up forces having expended their energy in one eruption remained quiescent for a season. The ordinary atmospheric and vegetable agencies then asserted themselves very much as at present, though probably with greater force and intensity. Meanwhile the imprisoned fires gathered new force, burst forth again and destroyed the peaceful work that had gone on during the period of rest. Thus these opposite manifestations of natural forces succeeded each other through long ages, until the reign of peace was established and the powers of violence and terror were permanently dethroned.

The lava outpourings during this period of volcanic activity have given our Park the form in which we see it to-day, except as this has since been modified by the agencies of denudation and erosion. The earlier outpourings consisted mainly of andesitic breccias; the later of rhyolite, while all along there were smaller flows of basaltic lavas. The andesitic eruptions played their principal part in the up-building of the mountains. Over the greater part of the Absaroka and Gallatin Ranges the older granite and sedimentary rocks were buried beneath the lava, and the modern form of these mountains is that which time has wrought out from these igneous rocks.

These volcanic outbursts were evidently not so much of the character of molten lava as in later times. In many places the heat was not sufficient to consume organic substances, the forms of which have remained intact to the present time. The material was apparently not liquid enough to spread itself about like a lake, but instead banked up in the near neighborhood of eruption and thus promoted the building up of the mountains. It seems also to have been of a character that yielded readily to the agencies of erosion.

There were several craters from which these lavas issued

THE TRAVERTINE ROCKS.

—two or more in the Absaroka Range, one in the Gallatin Range, and two, which interest us more, in the interior of the Park, Mt. Washburn and Mt. Sheridan. No one can stand on the summit of Mt. Washburn and look down upon the forest-covered amphitheater that forms the watershed of Tower Creek, without feeling instinctively that he is standing on the rim of an ancient crater, which was once a seething caldron of molten lava, but is now clothed in a garb of beauty by the gentler agencies of nature.

In the process of time the eruptive material from these volcanoes showed a marked change in character. The later flows were mainly of rhyolite. It is this rock that makes the Park plateau what it is to-day. It was of a more liquid character than the early outflows, and spread itself all over the country, filling up its depressions and elevating the general surface of the basin by more than a thousand feet. The rock has a great variety of superficial habit, from the soft friable material which grinds to powder under the wheels of wagons, to the glassy structure so prominent in Obsidian Cliff. Nine-tenths of all the rock which the tourist sees is of this character, though its varied forms might lead him to a different conclusion.

Throughout the entire period of volcanic activity in this region there were limited outpourings of basalt, and the latest eruptions were of this character. Though small in extent, compared with the other rocks, it is the most important of all from a scenic point of view; for it always assumes a form that attracts attention. Prominent examples may be seen in the Middle Gardiner Cañon at Osprey Falls, and along the banks of the Yellowstone near Tower Falls.

Next in order of the great events in the geological evolution of the Park is the Glacial Epoch. Its work is

everywhere visible and certainly overspread the entire region. Unquestionably the Park was covered with one vast ice sheet, which even the warm ground where the hot springs were could not resist. Perhaps the most extensive and important of all the glaciers was the one which debouched from the Third Cañon of the Yellowstone and the Lower Gardiner, into the valley below. It came from two sources—one in the Absaroka Range at the head waters of Lamar River, and the other from the Gallatin Range, whence it moved eastward and curved around to the left over Terrace Mountain, joining the main ice stream in the Gardiner Valley. The debris borne along by these combined glaciers are strewn everywhere throughout the north of the Park, and are particularly prominent in the valley of the Yellowstone from the Park boundary north, halfway to Livingston. In the Gibbon Cañon, near the Falls, are great accumulations of drift boulders intermixed with mud. Hayden Valley and vast areas throughout the north of the Park are strewn with drift. One lone and impressive monument of this once mighty agency still rests in solitary grandeur on the bank of the Grand Cañon, near Inspiration Point. It is a huge granite boulder and must have been brought to its present situation by the ice.*

The glacier has been the main agency in giving the Park topography its present form; that is, it has done more than anything else to shape the valleys and hills and give the terrane its varied aspect, rounding and smoothing its elevations, plowing out its valleys and scooping out the depressions for its lakes. It has a less enviable reputation with those to whom falls the practical task of preparing highways for travelers throughout the Park. No obstacle to road build-

* See also page 320.

ing is quite so formidable as the masses of drift boulders so frequently encountered. They have cost the government thousands upon thousands of dollars. But they have been of great benefit in other ways, for the fine gravel beds are extensively used in building up a good road surface. One of these masses of gravel and sand is very remarkable and has proven a veritable gold mine to the government in its work around Mammoth Hot Springs. This is Capitol Hill, which is almost entirely built up of sand and gravel, very clean and free from loam, and mixed by nature in almost the identical proportions required for ordinary concrete. Another similar deposit is found on Swan Lake Flat, from which the material for the Golden Gate viaduct was procured.

The events of the volcanic period of the Park history are preserved in one of the most perfect natural records which the researches of geologists have ever brought to light. The place known as the Fossil Forests of the Yellowstone is a deep exposure of the volcanic rocks caused by the erosion of the valley of Lamar River. It discloses several consecutive horizons of vegetable growth separated from each other by lava flows, which completely buried the subjacent growths and provided a foundation for those above. Beginning with the first or lowest, it is clear that conditions prevailed at the time which were highly favorable to vegetable growth, and that these continued long enough for giant trees to attain mature size. Finally this season of growth was rudely interrupted by the violent outburst of a volcanic eruption. Vast masses of ejected material overwhelmed and submerged the land. In this particular locality the heat was not intense enough to consume the trees, although it killed them and probably reduced most of them to mere stubs. In the course of long

ages since that time the percolation of siliceous waters has turned the organic forms into stone by the process of substitution, and has thus preserved a most faithful picture of the vegetable life of that period, and an infallible proof of the agencies that destroyed it.

Some of the petrifications are very perfect. Roots, bark, parts showing incipient decay, worm holes, leaves—all are preserved with absolute fidelity. The rings of annual growth may be counted, and these indicate for the larger trees an age of not less than five hundred years. Some of the stumps are fully ten feet in diameter. Here and there the ponderous roots stand imbedded in the rock face of the cliff, where erosion has not yet undermined them. In one case, a large tree that had fallen before petrifaction lies partly exposed, both ends being still imbedded in the rock. Some hollow trees show interiors beautifully lined with holocrystalline quartz.

After the first eruption had ceased a period of quiescence followed, during which the ordinary atmospheric and aqueous agencies began work, eroding the surface in some places and depositing the products of erosion in others, while vegetation rapidly covered the newly-formed soil. A subsequent volcanic outburst destroyed this second growth and gave a new horizon, on which the same process was repeated. This continued until there were at least nine, and probably twelve, of these consecutive growths.

How long it took each growth to reach maturity; how long each flourished afterward before destruction; and how long the several eruptions suspended vegetable life are matters largely conjectural. But at the very lowest estimate the time represented by these various accumulations can not be less than ten thousand years.

That these early trees were of a different species from

those which now flourish there, need not excite surprise, for climatic and other conditions are wholly changed. But an equal difference seems also to have prevailed between the successive growths, the trees of which were not only unlike each other, but more than half of them hitherto unknown to science. Seventy species in all have been identified and described.

The cessation of active eruptions with the later basalt outpourings did not mean the cessation of volcanic activity in this region. It has continued ever since in the form in which we see it to-day, although at one time far more widespread than at present. There is some evidence also that molten matter has been seen in certain localities in the Park within historic times. There is no doubt that the source of the energy which is seen to-day in the hot springs and geysers is identical with that which caused the eruptions of former times. Attempts have been made to explain this heat as originating in chemical action, or from the retained heat of the lava flows; but there are insuperable objections to both theories. It is necessary to go back to the great reservoir of internal heat, which here, as in all volcanic regions, must be presumed to lie near the surface. One disquieting inference from this theory is that the security of our Park may not be as perfect as could be desired, and that the old pent-up forces may yet assert themselves with appalling results.

The action of this internal heat, as seen in the thermal phenomena of the Park, has been very general over its area, but has nowhere produced any marked change in its topography. The terraces at Mammoth Hot Springs are the only considerable exception. They have wrought an extensive change on the mountain side where they are found, extending from the Gardiner River back three miles

and up about 1,500 feet to the top of Terrace Mountain. In the other hot springs districts the changes consist only of comparatively thin incrustations built up of deposition from the hot waters.

The period of time through which this thermal action has been going on is very great, and presumably dates from the last of the volcanic eruptions. It certainly antedates by a long period the Glacial Epoch, for drift is found on the summit of Terrace Mountain, which is itself a creation of hot springs deposits. Efforts have been made to measure the rate of deposition from the springs in the geyser basins, and to calculate therefrom the time required to do the work which has actually been done. The method is one of great difficulty and uncertainty, but indicates a minimum period of twenty-five thousand years. It is probably much greater than this.

The area of hot springs action in the Park is very extensive, far more so than surface indications would lead one to suppose. All over the Park Plateau are to be found various substances formed by the decomposition of volcanic rock through the agency of steam and hot water. The remarkable coloring of the Grand Cañon is that of the various substances formed by this decomposition. There are many other places in the Park where cañons like this might exist if the eroding agencies were there to carve them out. The government work in the building of roads throughout the Park has revealed the existence of "formation" in many places where it would not be suspected from superficial appearances.

The erosion of the Grand Cañon, one of the most marvelous pieces of nature's handiwork, is connected with another profound change in the topography of the Park. The surface of the Yellowstone Lake once stood 160 feet

higher than at present, and its waters flowed through the narrow gorge of Outlet Creek into Heart Lake, and thence into Snake River, thus placing the entire watershed of the lake on the Pacific Slope. In those times the Continental Divide passed over the summit of Mt. Washburn. Whether from some natural convulsion in this region, or the damming up of the southern outlet by Glacial ice, or from whatever cause, the waters of the lake found an outlet over the natural dam at the eastern base of Washburn, and began flowing north. The immense body of water stored in the lake and its overflow during the ages that have since elapsed have excavated this wonderful cañon in the decomposed rhyolite. The old shore line of the lake has been identified in many places.

In the vast but unknown period since the great events which we have noted were complete, the only agencies which have modified the topography of the country, except the hot springs action, are those of denudation, erosion and vegetable growth. The succession of the seasons, the action of wind and rain and snow, the growth of forests and other vegetation, the flow of the streams, have all been instrumental in giving the Park its present actual appearance. No profound change has been produced by these agencies, but their influence upon the superficial aspect of nature has been very great.

It is an interesting but never-ending study, that of the rocks of the Yellowstone Park, and impossible of extended treatment here; but that the reader may have some assistance in his attempt to identify them, if he visits the Park, the following references are given to the more important outcroppings along the main route.

Upon entering the Park from the north the tourist alights in a bed of glacial drift and sees strewn all around him granite and other boulders brought down from the Gallatin and North Absaroka ranges.

The rock from which the entrance gate is built is from a basalt outcrop just across the Yellowstone from Gardiner. Nearly every piece is a section of an hexagonal prism.

The valley of the Gardiner along which the road lies is on the line of a fault where the earth's crust parted, that on the right dropping down and that on the left lifting up, and forming the feature now known as Mt. Everts. It is mainly composed of sedimentary rocks—limestones and sandstones. Along the eastern portion is a covering of rhyolite distinctly prominent in the bold escarpment of which a salient angle fronts Bunsen Peak and the valley of the Middle Gardiner.

Soon after the road leaves the river and begins the ascent of the hill it strikes the travertine deposits of Mammoth Hot Springs. The road is cut through this formation in several places.

In ascending the hill above Mammoth Hot Springs the road lies in the travertine most of the way for three miles, and in one place passes through a remarkably confused mass of broken formation locally called the "Hoodoos."

The Golden Gate Cañon is through rhyolite rocks.

The rocky formation of Bunsen Peak is of dacite porphyry surrounded by rhyolite and basalt. A beautiful display of the latter rock may be seen in the walls of the Gardiner Cañon behind the mountain.

Swan Lake Flat is covered, as the visitor will readily observe, with glacial drift.

Near the seventh mile post, where the road crosses the Gardiner River, about a thousand feet up stream, may be seen a fine outcropping of basalt broken up into angular boulders. Quantities of this rock have been crushed for use on the roads.

The Gallatin Range, in full view, has many exposures of sedimentary rocks, limestone and sandstone.

Along the front of Mounts Holmes and Huntley and of Trilobite Point are exposures of the Archæan rocks, granite and gneiss.

The tourist route now lies almost wholly in the rhyolite rocks until Hayden Valley is reached. The appearances of this rock are very varied, one of the extreme forms being seen in Obsidian Cliff. In some places the rock is hard and weathers well, but as a general thing it is soft. This is the

case in the picturesque exposures at Virginia Cascades and in the Gibbon Cañon above the falls, although at the sites of both these cataracts the rock is hard enough to resist the action of the water.

All over the high plateau the road work has encountered a rock which is largely glassy rhyolite or obsidian, and although it can be removed only by blasting, it crumbles to pieces upon exposure. This characteristic accounts for the fact that in passing through the forests where this rock mostly abounds one would not suspect its presence except by digging into the ground. This condition prevails all along the road between Norris and the Grand Cañon.

Along the shore of the Yellowstone Lake the road passes over lacustrine deposits for considerable distances which were laid down when the lake stood at its ancient level.

Along the Yellowstone River from Mud Geyser to the head of the rapids the road lies all the way in glacial drift, which indeed extends along the river amid outcroppings of rhyolite to below the site of the Grand Cañon Hotel.

The Grand Cañon is carved through decomposed rhyolite.

On leaving the Grand Cañon Hotel for Mt. Washburn, the road across the undulating plain to the base of the mountain lies in glacial drift which overspreads in a thin coat the underlying rhyolite.

Where the road crosses the east fork of Cascade Creek and begins the ascent of the mountain it enters the area of andesite rocks in the form of the early basic breccias.

The road continues in this rock to the summit of the mountain and down the northern slope to within three miles of Tower Creek where it again comes into an area of rhyolite.

Glacial drift is everywhere found in the lower valley of Tower Creek.

Andesites compose the bed of the Yellowstone all along the lower course of the Grand Cañon. Below Tower Falls this is capped by a conglomerate of "gneissic and andesitic pebbles in friable sandstone," and this by a wonderful wall of columnar basalt.

Rising from the bottom of the cañon a mile below Tower Falls is a stately, isolated column of rock that has resisted

the wear of time. It is 260 feet high, but does not rise to the level of the basalt.

The road from the Yellowstone to the top of Crescent hill divide lies mainly in the early acid and basic breccias, or andesitic lavas.

All over these portions of the Park, beginning on the northern slopes of Washburn and extending east to Soda Butte the ground is strewn with "specimens" of various sorts—agate, chalcedony, onyx, jasper, garnets, amethyst, etc. The names Specimen Ridge, Garnet Hill, Amethyst Creek and several others took their rise from this circumstance.

The ride across the high plateau from Crescent Hill to the Gardiner River is everywhere through the glacial drift, but with frequent outcroppings of rock *in situ*. Basalt and early acid breccias (andesite) are prevailing rocks, with an outcropping of limestone near the crest of the slope descending to Black-tail-deer Creek.

The immediate valley of this stream is composed of rhyolite, but the basalt recurs again along the east Gardiner, and the beautiful Undine Falls is over this rock. The cañon for a considerable distance along the hillside below the falls is carved out of the same material.

From the high ground where the road emerges from Crescent Hill Cañon a splendid view is had of the country across the Yellowstone River. The mountains there are composed mainly of Archæan rocks, and in these are found the only gold and silver veins in the Park.

CHAPTER III.

GEYSERS.

The hot springs of the Yellowstone National Park may be roughly divided into two classes, eruptive and non-eruptive. To the first the term geyser is applied, while the term hot springs is restricted to the second. These two classes pass into each other by insensible gradations and the line of demarcation it is not possible to draw. The following description will pertain only to those examples about which there is no doubt, and which may be taken as types of their class.

A geyser may be defined as a periodically eruptive hot spring. The name, as might be expected, is of Icelandic origin, and comes from the verb *geysa,* to gush. The general characteristics of a true geyser, as illustrated by the most perfect example known, Old Faithful in the Yellowstone Park, are the following:

(1.) There is an irregular tube descending from the earth's surface to some interior source of heat.

(2.) The mouth of this tube may be either a self-built mound or cone (as in the example), or simply an open pool.

(3.) Into this tube meteoric water finds its way and is subjected to the action of heat.

(4.) The result is an eruption and expulsion of the water from the tube with more or less violence.

(5.) The eruption is generally preceded by slight preliminary upheavals leading gradually to the final outburst.

(6.) After cessation of the eruption there is a heavy escape of steam.

(7.) A quiescent period, generally of indeterminate duration, follows during which the conditions necessary for an eruption are reproduced.

Geyser phenomena have attracted a great deal of scientific attention, and many theories have been advanced to explain them. Passing over for the present the less important, attention will first be given to Bunsen's theory, because it is, upon the whole, the most satisfactory yet advanced. This theory was a direct deduction from observations upon the Great Geyser of Iceland, and has been experimentally illustrated by artificial examples.

The fundamental principle upon which it is based is the well known fact that the temperature of the boiling point of water varies with the pressure to which the water is subjected. At the sea level, under the pressure of one atmosphere (fifteen pounds to the square inch), the boiling point is about 212 degrees Fahrenheit. Under a pressure of two atmospheres it is 250 degrees; of three, 275 degrees; of four, 293 degrees, and so on. At an altitude like that of the Park plateau, where the atmospheric pressure is much less than at sea level, the normal boiling point is about 198 degrees, but the law of variation due to pressure conditions applies exactly as in lower altitudes.

If water, subjected to great pressure, be heated to a temperature considerably above that of its normal boiling point, and if then the pressure be suddenly relieved, it will almost instantaneously be converted into steam; a fact which always operates to enhance the danger from the explosion of steam boilers. In the case of an ordinary geyser, it is readily seen that in the long irregular tube descending to great depths there are present the necessary conditions for subjecting the water to great pressure. At the surface the pressure is that of the weight of the atmosphere cor-

responding to the altitude; at a certain depth below (33 feet at the sea level, but less at higher altitudes) it is twice as great; at double this depth three times as great, and so on.

Suppose, now, that there is an interior heat at some point along the geyser tube well below the surface. The boiling point of water in the vicinity of the heat supply will be higher than at the surface in definite relation to its distance down. If the tube be of large diameter and the circulation quite free, the water will never reach this point, for it will rise nearer the top, where the boiling point is lower and will pass off in steam. The spring will thus be simply a boiling or quiescent spring. But if the tube be comparatively small and if the circulation be in any way impeded, the temperature at the source of heat will rise until it reaches a boiling point corresponding to its depth. Steam will result, and will rise through the water, gradually increasing the temperature in the upper portions of the tube. After a time the water throughout the entire tube becomes heated nearly to the boiling point and can no longer condense the steam rising from below, which then accumulates until its expansive power is great enough to lift the column above and project some of the water from the tube. This lessens the weight of the column and relieves the pressure at every point. In places where the water had been just below the boiling point, it is now above, and more steam is rapidly produced. This throws out more water, still further lightens the column, and causes the generation of more steam, until finally the whole contents of the tube are ejected with terrific violence.

From this explanation it is apparent that anything which impedes the circulation of water in the geyser tube will expedite the eruption. The well-known effect of

"soaping geysers" may thus be accounted for. As oil thrown upon waves gives a viscosity to the surface, which greatly moderates their violence, so the addition of soap or lye makes the water of the geyser tube less free to circulate, and thus hastens the conditions necessary to an eruption.

The apparently contrary process of violently agitating the water of the geyser, as by stirring it with a stick, sometimes produces the same effect; but this results from the sudden forcing upward of masses of superheated water, instead of allowing them to rise and gradually cool.

That Bunsen's theory really explains the phenomena of geyser action there can be little doubt. It is true that in no single geyser does one find a perfect example of the theory. But it must be remembered that typical conditions probably never exist. The point of application of heat; the mode of application, whether from the heated surface of rocks or from superheated steam issuing into the tube; the diameter and regularity of the tube; the point of inflow of the cold water, are all matters which influence the eruption and determine its character. In the endless variety of conditions in nature one need not wonder at the varying results. He should rather wonder that in a single instance nature has produced a combination of such perfection as is found in Old Faithful, which, for thousands of years has performed its duty with the regularity of clock work.

There are various other theories, each with some particular merit, which may be briefly referred to. Sir George Mackenzie, who visited Iceland in 1810-11, thought the geyser tube at some point beneath the surface curved to one side and then upward, communicating with a chamber in the immediate vicinity of the source of heat. The water

in this chamber becomes heated above the boiling point, and, expanding, forces the water into the tube until the chamber is finally emptied to the level of its outlet. Any further expulsion of water lessens the weight of the column above. Bunsen's theory comes into play, and with the accumulated pressure of the steam in the chamber, produces a violent eruption.

Prof. Comstock, who visited the Park in 1873, thought that there were two chambers, the lower being in contact with the source of heat, and the upper acting as a sort of trap in the geyser tube. After a sufficient force of steam has accumulated in the lower chamber, it ejects the contents of the chamber above.

S. Baring-Gould, who visited Iceland in 1863, observed that if a tube be bent into two arms of unequal length, the shorter of which is closed, and if the tube be filled with water and the shorter arm then heated, all the characteristic phenomena of geyser action result, the water being finally ejected with explosive violence from the longer tube.

Now, it is probable that in nature each of these theories may find illustration, but it must still be acknowledged that in all cases Bunsen's theory is the partial explanation, and in many the only adequate one.

The most superficial examination of the geysers in the Park will disclose two widely different classes as regards their external appearance and mode of eruption—the fountain geysers and the cone geysers.

In the fountain geyser there is no cone or mound, but in its place a considerable pool, which in intervals of rest bears a perfect resemblance to the larger quiescent springs. The eruption generally consists of a succession of prodigious impulses by which large masses of water are thrown up one after another. There is ordinarily no continuous jet.

To geysers of this class, Mackenzie's and Comstock's theories would seem to find closer application than to any others. Noted examples are the Fountain, the Great Fountain, the Grand and the Giantess Geysers.

The cone geysers, on the other hand, have no pool about the crater and water is not generally visible in the tube. There is always a self-built cone or mound of greater or less prominence, ranging from a broad, gently-sloping mound, like that of Old Faithful, to a huge cone like that of the Castle. The eruptions from these geysers usually take the form of a continuous jet, and are more in accordance with the theory of Bunsen. Prominent examples are the Giant, Castle, Old Faithful, Lone Star and Union.

An interesting and singular fact pertaining to this region is that in most cases the springs and geysers have no underground connection with each other. Water in contiguous pools stands at different levels, and powerful geysers play with no apparent effect upon others near by.

It is another interesting question to know whence comes the water for these geysers and hot springs. Into the hidden caverns of "Old Faithful" flow perhaps a quarter of a million gallons per hour. This is a large stream, but it is a mere trifle compared with the entire outflow of hot water throughout the Park. The subterranean passages by which the necessary supply is furnished to all these thousands of springs, certainly constitute the most intricate and extensive system of water-works of which there is any knowledge.

Not the least wonderful of the features of the great geysers are the marvelous formations which surround them, more exquisitely beautiful than any production of art. They are much finer than those to be found around the ordinary quiescent springs. The falling or dashing of the

Cone and Fountain Geysers (Old Faithful and the Great Fountain).

hot water seems to be essential to the most perfect results. To say that these rocky formations simulate cauliflower, sponge, fleeces of wool, flowers or bead-work, conveys but a feeble idea of their marvelous beauty. It is indeed a most interesting fact that nature here produces in stone, by the process of deposition, the identical forms elsewhere produced by the very different processes of animal and vegetable life.

These formations are all silica and are of flinty hardness. Bunsen, and Prof. Le Conte following him, assert it to be a rule that the presence of silica in the water is essential to the development of a geyser. In one sense this is true, and in another it is not. Should the heated waters find a ready-made tube, like a fissure in solid rock, this would serve for a geyser tube as well as any other. The Monarch Geyser, in Norris Geyser Basin, seems to have originated in this way. But in the general case, geyser tubes are built up, not found ready made. In such cases silica is an indispensable ingredient of the water. A calcareous deposit, like that at Mammoth Hot Springs, would lack strength to resist the violent strain of an eruption. So it is found to be a fact that silica is the chief mineral in the water of all important geysers.

CHAPTER IV.

HOT SPRINGS AND KINDRED FEATURES.

Under this general head will be included all the various forms of thermal activity in the Park except the geysers, viz.: the quiescent springs, boiling springs, mud springs or paint pots, the steam vents and fumaroles.

QUIESCENT SPRINGS.

The quiescent spring stands at the opposite pole from the geyser. The conditions are such that the water nowhere reaches the boiling point, and the surface steams quietly away unruffled except by the passing breeze. There is not the smallest suggestion of the turbulence and violent energy of the geyser, but its whole behavior is listless and peaceful. In keeping with this character is the inimitable beauty of its soft blue waters. It is not simply the beautiful hue of great depths of clear water. In ordinary pools, however deep and clear, one does not find all the colors of the spectrum, flitting about, as though seen through a revolving prism. Sometimes there is an iridescent effect similar to that of a film of oil upon water; but there is no oil here. There are doubtless many contributing causes that produce these remarkable effects. There is first a great depth of clear water which always presents a beautiful appearance. Then there are the mineral deposits on the sides of the crater, producing indefinite reflection, the effects of which are multiplied by the refractive power of the water. The mineral ingredients dissolved or suspended in the water doubtless add to the effect.

The rims about the quiescent springs are often very

beautiful, and the observer is astonished to see how they stand up above the general surface of the ground so evenly built that the water has hardly a choice of route in flowing away. Tyndall, however, makes this puzzling phenomenon clear. He says:

"Imagine the case of a simple thermal siliceous spring, whose waters trickle down a gentle incline; the water thus exposed evaporates speedily, and silica is deposited. This deposit gradually elevates the side over which the water passes, until finally the latter has to take another course. The same takes place here; the ground is elevated as before, and the spring has to move forward. Thus it is compelled to travel round and round, discharging its silica and deepening the shaft in which it dwells, until finally, in the course of ages, the simple spring has produced that wonderful apparatus which has so long puzzled and astonished both the traveler and the philosopher."

What will astonish the visitor even more is the fact that this building up is often the result of vegetable growth. The heat of the water would seem incompatible with the existence of life within it; but it is not so. Low forms of algous growth abound in nearly all the springs where the temperature is below 185 degrees Fahrenheit. The soft, slippery, colored substance that borders many of the springs and the rivulets which flow from them is a form of vegetable life—very elementary, it is true, but still life.

These algous growths are even considered as one of the most important agencies in causing the deposition of the mineral ingredients of the waters. This deposition takes place mainly, however, as a result of evaporation. It is generally supposed that it results from cooling, but this is true only to a small extent. Water from the springs has been kept for years and reduced nearly to the freezing point

without deposition; but, singularly enough, actual freezing forces it to give up its mineral ingredients.

As in the case of the geysers, so in that of these quiescent springs, there is an almost infinite variety; but popular interest attaches mainly to those like the Morning Glory, which are such gems of beauty that they stand unrivaled among the works of nature or art. There are several examples of this higher order in the Park. The Morning Glory is the most beautiful in the Upper Geyser Basin. Prismatic Lake and Turquoise Pool in the Midway Basin are the largest in the Park. There is a very beautiful one on the west shore of the Yellowstone Lake a hundred yards from the road junction.

The celebrated Mammoth Hot Springs on the Gardiner River are quite different from those in any other part of the Park, although in the matchless beauty of coloring they resemble and possibly excel the finer examples in the geyser basins. The water of these springs, as already explained, holds carbonate of lime in solution, while most of the others contain silica. To this fact must be attributed the peculiar character of the formations at Mammoth Hot Springs. Wherever the deposits of springs are calcareous, the character of the formations is different from those produced by the deposit of silica. They rise in terraces one above another, and mold for themselves overhanging bowls of transcendent beauty in form and color.

The quantity of mineral matter held in these calcareous waters is astonishing, and its rate of deposition is very rapid. Consequently, the growth of the "formation" is rapid, and beautiful bowls and terraces are built up in one or two seasons. The rapidity of deposit is so great that commercial advantage is taken of it, and a licensed resident of the Park makes his living by coating specimens in

these springs and selling them to the public. He would soon go out of business if compelled to await the slow process of the silica waters.

But if the growth of these deposits is rapid, their permanence is unfortunately much less than that of other formations. The subterranean channels are weak and give way easily to pressure. New outlets break forth and the general history of the springs is that of constant change. How extensive and rapid this has been in the past is evidenced by the presence of many well grown trees which are still standing, though killed and partly buried by the deposit.

There are many other forms of quiescent springs throughout the Park. Some are simple open pools, filled with turbid water, exhibiting no beauty or attractiveness. Others are densely muddy and positively repulsive. In the lower geyser basin there is an extensive pond or lake of hot water, besides several of smaller size, in all of which the water has a dark, almost black, color. It is one of these springs that is called the Firehole, from the appearance of a lambent light blue flame beneath the water, caused by the escape of superheated steam from a fissure in the rock.

BOILING SPRINGS.

The boiling spring is intermediate between the quiescent spring and the geyser. The circulation is sufficiently free to prevent a great rise of temperature in the lower depths of the tube, and nothing more than a surface ebullition, often extremely violent, results. These springs are generally objects of secondary interest. They are simply enormous caldrons, but in some instances they exhibit peculiarities which are very interesting. Several of them show

a geyseric tendency, in which the eruptive force is expended before it can produce any decisive result. Among the more important of these features is Beryl Spring, in the Gibbon Cañon, on the right bank of the river, close to the road. It discharges a large volume of hot water. There is another and larger spring in the valley of the Gibbon near its mouth and close by the side of the road leading into the Park from the west. There are several of these springs in the Firehole Geyser basins. Excelsior Geyser, from its very infrequent eruptions, may more properly be considered a boiling spring. The quantity of water that it discharges is immense. Norris Geyser Basin has a few of these springs, though none of particular interest. On the west shore of the Yellowstone Lake, near the road way, is a large boiling spring, the waters of which have a faint muddy tinge. Perhaps the most interesting feature of this class in the Park is Sulphur Spring, a pseudo-geyser at the west base of Sulphur Mountain. Its ebullition is extremely spasmodic and violent, but the discharge of water very small. It is heavily charged with sulphur and the rim of the pool and edges of the stream carrying the overflow are bordered with brilliant yellow.

Between the true quiescent spring and the boiling spring there is every gradation. The various examples can be numbered by the thousands and no two are alike. Every spring has its own individual character.

"FRYING PAN" SPRINGS.

A peculiar phenomenon to which it is difficult to assign a distinctive name, is exemplified in the feature called the "Devil's Frying Pan," three miles north of the Norris Geyser Basin. It is a true reproduction, upon a large scale, of the appearance of the ordinary frying pan. This phe-

nomenon has a wide distribution, and something resembling it may be found in certain pools or lakes, the bottoms of which are apparently full of the bubbling vents. The most striking example is Turbid Lake, which lies a short distance from the east shore of the Yellowstone Lake. It is a considerable body of water, at least half a mile across, and is fed by the purest streams of the mountains. But nearly its entire bottom is overspread with these vents, and the steam and gas from them escape in feeble bubbles at the top. The whole appearance is like that of a tub of water that has been used in washing. The outlet of the lake is a turbid stream, not capable of sustaining fish.

MUD SPRINGS.

A very characteristic and interesting class of phenomena are the mud springs that abound in all parts of the Park. They present an almost endless variety of form and aspect, but there are only two that need now detain us—the "paint pots" and the eruptive springs, like the Mud Geyser on the Yellowstone River.

The mud springs, or Paint Pots, as they are now always called, are extremely curious phenomena. They are caused by the rising of steam through considerable depths of earthy material. The water is just sufficient in quantity to keep the material in a plastic condition, and the steam operates upon it precisely as it does upon a kettle of thick mush. Generally there are various mineral ingredients, mostly oxides of iron, which impart different colors to different parts of the group. As the steam puffs up here and there from the thick mass, it forms the mud into a variety of imitative figures, prominent among which is that of the lily. These figures immediately sink back into the general mass, only to be formed anew by other puffs of steam. The

material is so fine as to be almost impalpable between the fingers. Lieutenant Doane, however, justly observes that "mortar might well be good after being constantly worked for perhaps ten thousand years." This "mortar" has actually been used with good results in "calsomining" walls.

The Paint Pots, in one form or another, are found in a great many situations, but there are only three localities where they are grouped in sufficient number to attract especial interest. These are the Gibbon Paint Pots on the border of the Gibbon Meadows, east of the road, rarely seen by tourists; the Mammoth Paint Pots directly in front of the Fountain Hotel and near the Fountain Geyser, and a group on the west shore of the Yellowstone Lake, near the road junction.

Mud Geyser (or Mud Volcano, as it was originally and more properly called) is considered by many the most extraordinary and wonderful natural feature in the Park. In point of beauty it stands at the antipodes of the quiescent pool. It is uncanny, repulsive and suggestive of everything horrible and uncouth. A similar feature to that just described is found in the Devil's Inkstand, on the northern face of Mt. Washburn.

STEAM VENTS.

The steam vents exhibit still another striking form of thermal phenomena in the Park. They exist where surface water is apparently lacking and where there is a vast quantity of steam generated far below. The result is that there is no accumulation of water in the tube, which might eventuate in an eruption, but it is all blown out in fine mist as fast as it runs in. The most prominent example is in Norris Geyser Basin where, within a small area, there are several of these vents. For many years the Growler and

Hurricane held the record as steam producers, but lately they have yielded a part of their vigor to a new vent which exhibits greater power than either of its predecessors. The force of the steam as it comes from these vents is terrific. A large quantity of water is blown out in the form of mist and the rain that falls on the leeward side of the steam column is like the perpetual shower at the base of Niagara.

Roaring Mountain has one of these powerful vents near the summit. There is another large one on the east shore of the Yellowstone Lake, called Steamboat Spring, and there are many smaller ones in different localities.

FUMAROLES.

The fumaroles are small vents from which the steam escapes quietly and without any marked exhibition of force. They are found all over the Park, but it is only in cold, damp weather when the steam is rapidly condensed, that their actual frequency can be appreciated.

SPRINGS.

Many of the stream sources throughout the Park are warm. Springs that have every appearance of being cold are often found, upon examination, to have temperatures far above the normal for spring water. In fact, the whole country is in a heated condition near the surface, and the evidences thereof are so numerous and frequent that they cease to attract attention from those who are familiar with them.

Reference has already been made to the fact that mineral ingredients in the hot springs of the plateau are composed mainly of silica, while those at Mammoth Hot Springs are nearly pure travertine. The hot waters in the latter case have decomposed the underlying limestone which are here near the surface, whereas farther out in the Park the min-

eral ingredients come almost exclusively from the lavas in which there is only a trace of carbonic acid. This difference in composition produces the great difference in the superficial appearance of the deposits. Nothing could be more unlike than the formations at Mammoth Hot Springs and those around the Great Fountain or Old Faithful Geyser; yet each in its way is a transcendently beautiful specimen of nature's handiwork.

The temperature of the thermal springs of the Park varies all the way from cold spring water up to the boiling point, 198 degrees. In the geysers it rises above the boiling point, though, from the nature of the case, the measuring of such temperature is practically impossible. In a few instances temperatures of 200 degrees have been recorded.

The following table gives an analysis of the principal waters of the Park. It is the work of the Chemical Laboratory of the United States Geological Survey, and was performed by Frank Austin Gooch and James Edward Whitfield:

Analyses of Waters of the Yellowstone Park. The amounts are grammes per kilogramme.

	Silica.	Sulphuric Acid.	Carbonic Acid.	Boracic Acid.	Arsenious Acid.	Chlorine.	Basic Oxygen.	Iron.	Aluminum.	Calcium.	Magnesium.	Potassium.	Sodium.
Cleopatra Spring	0.0517	0.4395	0.6287	0.0226	0.0031	0.1749	0.1954	0.0049		0.3076	0.0729	0.0511	0.1299
Soda Butte Spring	0.0335	0.0614	1.2490	0.0150	none	0.0315	0.1618	0.0069		0.2325	0.0632	0.0238	0.0575
Fearless Geyser	0.4180	0.0367	0.0046	0.0223	0.0022	0.6705	0.0113	0.0006	0.0002	0.0092	0.0001	0.0415	0.4046
Constant Geyser	0.4685	0.0923	0.0155	0.0317	0.0018	0.5740	0.0185	trace	0.0048	0.0146	0.0018	0.0745	0.3190
Fountain Geyser	0.3315	0.0195	0.2307	0.0138	0.0027	0.3337	0.0654	0.0002	0.0057	0.0014	0.0010	0.0379	0.3522
Great Fountain	0.3182	0.0187	0.2107	0.0100	0.0017	0.3508	0.0472	trace	0.0021	0.0017	0.0023	0.0145	0.3351
Excelsior Geyser	0.2214	0.0146	0.3825	0.0161	0.0026	0.2793	0.0955	0.0018	0.0012	0.0012	0.0022	0.0325	0.4186
Old Faithful Geyser	0.3828	0.0152	0.0894	0.0148	0.0021	0.4391	0.0419	trace	0.0009	0.0015	0.0006	0.0267	0.3666
Giantess Geyser	0.3917	0.0167	0.1055	0.0233	0.0006	0.4408	0.0411	trace	0.0049	0.0007	0.0012	0.0410	0.3451
Beehive Geyser	0.3042	0.0271	0.0920	0.0145	0.0011	0.3894	0.0364	trace	0.0029	0.0039	0.0002	0.0213	0.3118
Grotto Geyser	0.2590	0.0148	0.3155	0.0290	0.0003	0.3045	0.0807	trace	0.0036	0.0039	0.0010	0.0249	0.3853
Taurus Geyser	0.2926	0.0385	0.3210	0.0149	0.0007	0.1935	0.0781	trace	0.0040	trace	0.0009	0.0235	0.3202

CHAPTER V.

FAUNA OF THE YELLOWSTONE.

The big game animals that were found throughout the United States when settlement took possession of the country, have disappeared except from a few favored localities. Driven back into the swamps and mountains they still survive there in some degree of safety. The noblest of them all, the buffalo, has long since been practically exterminated and most of the other large species have drifted rapidly in the same direction. The better sentiment of the country deplores this unhappy fate, and in recent years there has grown up a determined purpose to avert it.

Two things are necessary to this end—efficient game laws and ample game preserves. The first rests largely with the individual States and the second with the general government. The many forest reserves which the government has created are practically game preserves also, by virtue of the exclusion of settlement; and if the States in which they are located will but enact and enforce efficient game laws, the perpetuation of the native fauna will be amply ensured.

The most important of all these game preserves, both on account of its extent and the laws and regulations governing it, is the Yellowstone Park. The Act of Dedication recognized its function in this respect, and the Protective Act of 1894 made it definite and specific. It is admirably fitted by nature for this particular purpose. It offers little in a commercial way to tempt the cupidity

of man. Its mineral wealth is buried so deeply under the lava that no miner will ever reveal it. Its altitude and climate unfit it for agriculture. Its forests are of little value for lumber. But as a home for the native species of the continent it possesses unrivaled advantages.

"The broad expanse of forest incloses sequestered nooks, and enticing grassy parks, with absolute seclusion in mountain recesses admirably adapted for the homes of wild animals. It is the great diversity of its physical features, offering within a restricted area all the requirements for animal life, which fits it for the home of big game. Abundant food supply, shelter from wind and weather in winter, cool resorts on the uplands in summer, favorable localities for breeding purposes and the rearing of young, all are found here. The Park supplies what is really needed—a zoological reservation where big game may roam unmolested by the intrusion of man, rather than a zoological garden inclosed by fences, and the game fed or sustained more or less by artificial methods." *

It is a matter of regret that the many years of lax administration in the early history of the Park largely nullified its purposes as a game preserve. Killing of wild animals within its borders was not entirely prohibited until 1883, and the restricted license previously in force was shamefully abused. Some of the larger species were greatly reduced in numbers, while in a few instances they were nearly exterminated. In later years, particularly since the legislation of 1894, the elk, deer, bear and beaver have rapidly regained their former numbers, and there is now not the smallest reason to apprehend their extinction. The outlook for the antelope and mountain sheep is good

* "The Yellowstone National Park as a Game Preserve," by Dr. Arnold Hague.

though not so flattering. The buffalo and moose are nearly gone, with no prospect of restoration except through the direct agency of man in addition to his work of protection. The smaller species—gophers, squirrels, woodchucks, etc.,—flourish in great numbers. The birds have never suffered from poaching and the fishes have multiplied extensively since the Park was created. The killing of any of the species except fish is absolutely forbidden and it is an interesting fact that this protection is fully understood by the animals themselves. They exhibit a familiarity and fearlessness in the Park which is a distinct advance from their native condition.

MAMMALS.

To enumerate the species which do, or may, flourish in the Park would be to give a list of the fauna of the Rocky Mountains. Among the mammals, interest naturally first attaches to the buffalo. That noble animal is part and parcel of the pioneer history of our country, and its sudden disappearance, as if some unseen hand had swept it from the earth, has been a theme of universal regret. Only a very few are left and the most of these are in private herds. The Park has the only herd that still roams in its native freedom, but unhappily it seems doomed to extinction except through some heroic measure of relief. The fact that Congress has taken a hand in its preservation and has made a special appropriation to that end is a significant proof of the high value set upon the perpetuity of this species.*

* The present purpose is to capture and corral the native herd in a situation where the winter snows are not so deep as in their present home in the Pelican Valley; to introduce new blood from the few remaining private herds; to provide

That other animal which has borne such a part in the frontier history of our country, and has been of more importance in the commercial world than all the other wild animals combined, is happily in a most flourishing condition in the Park. The American beaver abounds in nearly all the streams and evidences of its work are everywhere present. Here, better than in any other place in the world, the interesting life of this wonderful animal can be studied; for it, too, feels that it is safe, and that the presence of man does not mean its destruction.

The third in the alliterative trio of the most important American wild beasts, the bear, is likewise safe from even remote danger of extinction. These animals are now to be seen in every part of the Park. Around the hotels and working camps they have become exceedingly tame and are a never-failing source of delight to the tourist. They are at the same time an intolerable annoyance from their habit of breaking into tents and buildings in search of food.

The two well-known species, the grizzly and the black bear, flourish in the Park, but the latter by far the more numerously. Science does not specifically recognize the so-called cinnamon bear, which seems to be a variation in color from the black bear. The term white bear, as used by the early hunters, and silver tip, as used to-day, apply to the grizzly bear.

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forage and shelter, if necessary, and, of course, perfect protection; and thus let the herd recuperate and become better acquainted with its benefactors. The young will be gradually given their liberty with the expectation that they will not flee to the mountains, but will remain in the lower valleys where they can find subsistence in winter. It is earnestly to be hoped that this policy will succeed.

The most abundant species of the larger game is that superb and majestic animal, the American elk. It is to be seen in every part of the Park. Its present numbers and recent increase remove all danger of extermination. If a thousand elk were slaughtered every year from the overflow into the surrounding country, the natural increase would more than offset it. The Park is particularly adapted to the life of this animal. The open and partly wooded country in the east and north of the Park affords every desired condition—from the low warm valleys for winter to the high cool mountain sides for summer. The elk will always remain the most numerous among the larger game of the Park as it will always be the most attractive from the dignity and grace of its bearing.

Deer are abundant in two well-known species—the black-tail, or Dakota mule deer, and the white-tail. The first is the more common, and is found in nearly all parts of the Park. Their winter range is mainly in the north of the Park and they are as familiar around the buildings at Mammoth Hot Springs as a herd of domestic cattle.

The antelope and mountain sheep are much less numerous than the elk and deer, but there is no reason to suppose that they are not holding their own. The antelope range is in the north of the Park extending from Gardiner to Soda Butte and back on the northern slopes of Mt. Washburn. The mountain sheep range principally upon Mt. Everts and Mt. Washburn. In the winter season both antelope and sheep are seen near the road in the vicinity of Gardiner.

All reports indicate that the moose, which used to range through the southern portions of the Park, have well-nigh disappeared.

BRUIN AMONG THE FLOWERS—POSING FOR A PICTURE.

Among the fur-bearing animals there are, in addition to the beaver already mentioned, a large number of otter, and a few foxes of the common species. Muskrats are very abundant.

Of the strictly carnivorous species the mountain lion is the most important. It seems to be in no danger of extinction and is one of two animals that the authorities consider it necessary to kill for the protection of other game. The other of these animals is the coyote, whose power of increase baffles all efforts to exterminate it. The coyote is the only abundant species of the wolf genus known to exist in the Park.

There are two species of the lynx genus in the Park, the Canadian Lynx and the bobcat, or wild cat.

An animal which was very common in the Park ten years ago, but is now rarely seen, if at all, is the porcupine. What is the cause of its strange disappearance, and whether that disappearance is permanent or only temporary, no one knows.

Among the smaller species the groundhog, or eastern woodchuck, is exceedingly numerous and frequents the roadsides in all parts of the Park. The red squirrel is everywhere seen and the diminutive chipmunk is always scampering out from under the horses' feet. The pine marten is a rare animal, but nevertheless flourishes throughout the forests with no danger of disappearance.

BIRDS.

Although an ornithologist, in passing through the Park, would report a list of birds so extensive as to lead one to think that they abound in great numbers, there is really a noticeable paucity of the winged tribes. There are many species, but a scarcity of individuals except in a few cases.

It is stated by an authority on this subject that the birds of the Park seem distant and hard to see, and are therefore more difficult to study than those in the lower altitudes. The following list enumerates some of the more conspicuous:

The most numerous of all the species are the waterfowl that frequent the lakes and rivers. The pelican on the Yellowstone Lake is always an attractive feature of that body of water. It is a splendid bird, and, when seen in large numbers upon the water, it looks like a fleet of white boats. It is equally graceful in the air where it soars in magnificent curves between the blue of the water and the sky. The great breeding ground of the pelican is at the northeast corner of the lake, where its name is used to designate three important geographical features—Pelican Creek, Pelican Roost, an island, and Pelican Cone, a hill back in the interior.

The swan, though actually found in the Park, is rarely seen.

Gulls and terns are numerous on the larger lakes.

The grebe, the great blue heron, the sandhill crane, the mudhen, and the spotted sandpiper abound in limited numbers.

The water-ousel is one of the really numerous species of birds in the Park and it would seem as if the thousand torrents of that region furnish it with an ideal home. It may be seen everywhere among the foaming cascades and on the slippery rocks, and it remains in the Park in winter as well as summer. It is particularly numerous along the Gardiner River.

The Canada goose is a very frequent visitor to the Park in the fall of the year, when it may be seen in countless numbers among the marshes in the warm spring districts.

Wary as it is of the wiles of man, and watchful as it naturally is of his whereabouts, it doffs its fear in this protected region and remains in apparent indifference by the road sides as if conscious of its immunity from danger.

Ducks abound in great numbers and in all the more important species. Where the water from the hot springs keeps the streams open, they remain all winter. Around Mammoth Hot Springs they frequent the roads and barnyards for food and resemble at first sight domestic flocks. The sportsman who is forced to devise ways and means for catching these wary birds in the world outside would scarcely believe that they could become so tame when within the protection of the Park.

Among the larger birds of prey both the golden and bald eagles are occasionally seen, although they are not numerous. The fish-hawk or osprey is very common, and is found in all the streams. Its nests on rocky pinnacles are often mistaken for eagles' nests.

There are several species of hawk, and this bird is one of the most numerous in the Park. Its nests may be seen in considerable numbers in the tops of dead pine trees along the north shore of the Yellowstone lake. The western red-tail, or chicken-hawk, is also frequently seen.

Owls are not uncommon, the most conspicuous being the western horned owl.

Of the land birds that elsewhere furnish legitimate sport for the hunter, the ruffed grouse is the only one that is found in sufficient numbers to merit attention.

Among the scavenger and carrion birds the raven, the crow and the magpie are quite common. A familiar bird to all tourists who camp through the Park is the Rocky Mountain Jay, or "camp robber," as it is commonly called. This name, however, is a harsh one for so useful a bird, and camp scavenger would more correctly describe it.

The better known and more common among the other birds that live in the Park are the following: The robin, the blue bird, the chickadee, two nuthatches, the brown tree creeper, the Macgillivray warbler, the yellow throat, the winter wren, the tit lark, the Louisiana tanager, the meadow lark, the blue-headed blackbird, the white crowned sparrow, the Cassin purple finch, the pink-sided junco, the pine siskin, the kingfisher, northern violet-green and cliff swallows, and the Rocky mountain hairy woodpecker.

Among the winter birds are the water-ousel and the merganzer on the streams; and the ptarmigan, Bohemian wax-wing, snow-flake, and red poll, land birds.

FISHES.

It is now generally recognized that the Yellowstone Park affords the finest trout fishing in the world. There are a few other fishes, like the grayling in the Madison and its branches and white fish in the lower Gardiner; but the Park is practically an exclusive home for that most beautiful and interesting of all the fishes, the trout.

Not all the streams of the Park were originally stocked with fish. Where the waters leave the great volcanic plateau and fall to the underlying formations, the cataracts form impassable barriers to the ascent of fish. In the lower courses of all the streams there were native trout, but above the falls, with one exception, there were none. The exception of the Yellowstone River and Lake is a most interesting one. Why the Falls of Yellowstone, the highest and most impassable of all, should apparently have proven no barrier, is at first a puzzling question. But the solution is to be found in Two-Ocean Pass. Across this remarkable divide fish may easily make their way, and

the Yellowstone Lake is unquestionably stocked from this direction. We thus have an example, probably without parallel, of an extensive body of water on the Atlantic slope stocked by nature with fish from the Pacific.

Beginning with the year 1890 the United States Fish Commission took up the work of stocking all the fishless streams of the Park and to the present time have made the following plants:

10,000 yearling lake trout in the Yellowstone River above the falls in 1890.

30,000 yearling lake trout in the Shoshone Lake, in 1890.

12,000 yearling lake trout in Lewis Lake, in 1890.

3,350 yearling Loch Leven trout in Lewis Lake, in 1890.

3,350 yearling Loch Leven trout in the Shoshone Lake, in 1890.

9,800 Von Behr trout in Nez Perce Creek, in 1890.

7,800 yearling brook trout in Gardiner River, West Fork, in 1890.

4,500 yearling rainbow trout in Beaver Creek, in 1893.

1,000 yearling rainbow trout in Beaver Creek in 1895.

1,000 rainbow trout fry in De Lacy Creek and near Mammoth Hot Springs, in 1896.

10,000 brook trout fry in Willow and Glen Creeks, in 1901.

9,000 brook trout fry in Glen Creek, in 1902.

18,000 brook trout fry in Willow Creek, in 1902.

11,000 brook trout fry in Indian Creek, in 1902.

These plants have taken decisive root and there is now scarcely a hidden stream or lake in all this region that is without its attractions for the sportsmen. Full freedom of fishing in all the streams is allowed, except that the fish can be taken only by hook and line.

The trout of the Yellowstone Lake are to a large degree infected with a parasitic disease that renders them unfit for eating. Many efforts have been made to discover the cause of this condition, and a suitable remedy for it, but so far without success. The most reasonable explanation is to be found in the excessive number of these fish and the absence of sufficient food, whereby their vitality is reduced and they become an easy prey of parasites which a more vigorous constitution would throw off.

REPTILES.

Scarcely any reference need be made to the reptiles of the Park because of the extreme paucity of their number. There are a few lizards and toads, and an abundance of frogs. There are also three or four species of snakes, among which are the large bull snake and a diminutive water snake. Both are entirely harmless. The author has never seen a rattlesnake in the Park, but it is said that they have been seen in the low altitude near the mouth of the Gardiner River. They apparently do not exist as far up as Mammoth Hot Springs. The tourist may enjoy whatever satisfaction there is in the fact that there are no poisonous reptiles or other animals in the Park.

INSECTS.

It remains to assign to the smallest representatives of animal life in the Park (smallest in size but greatest in numbers) the most important place so far as the comfort of the tourist is concerned. The mosquito and kindred pests are exceedingly vigorous and active at certain seasons. They begin to appear late in June, and the energy of the mosquito is at its height in the early days of July. By the first of August it has nearly disappeared. It is aided in its career of torture by an exceedingly diminu-

tive gnat which flourishes for a brief period early in the season.

The reign of the mosquito is followed by that of several species of horse flies, which are desperately fierce and voracious in the late summer, and are a great drawback to the pleasure of driving.

Finally the common house fly abounds in even greater numbers than in lower altitudes and is an unmitigated nuisance in all camping operations.

GAME.

The tourist is often disappointed that he sees but little game in the Park, and hastens to the conclusion that the fact of its existence has been much overdrawn. He should remember that it is of the nature of wild animals to shun the haunts of man. In the summer season when tourists visit the Park herbivorous animals are nearly all in the higher altitudes with their cool retreats and greater freedom from annoying insects. They naturally do not congregate along the roadsides. It is nevertheless noticeable that their sense of safety is making them better acquainted with men and they are seen in ever-increasing frequency as time goes on. It is now very rare that the visitor is not favored with the sight of elk and deer somewhere in his tour. Bear he always sees. If he travels in the northeast section of the Park he is certain to see antelope. In the late autumn or early spring he may see almost any day, on the rugged cliffs of the lower Gardiner Cañon, a fine band of mountain sheep. Buffalo are now in evidence under compulsion in the corral near Mammoth Hot Springs. To him who travels the bridle paths of the Park away from the beaten routes the evidence of the presence of game quickly conquers all preconceived doubts.

The question is often asked whether the game interests of the Park would not be promoted by fencing the entire reservation. While fencing the boundary might be of some advantage in a few special localities, it would not be so if applied to the Park as a whole. The undertaking itself would be a stupendous one owing to the almost insuperable obstacles encountered on a straight line through a mountainous country. The fence would not restrain poachers, who, with a pair of plyers, could cut it wherever desired; but it would restrain government officials, who would not feel at liberty to cut it, and whose freedom of movement along the boundary would be curtailed thereby. Falling timber would keep the fence full of breaks unless it was constantly patched. In the winter deep snow would bury it in a thousand places and game could pass over it with ease, while the melting of the snow in spring would restore the fence and prevent their return. In fact, one of the greatest purposes of the Park as a game preserve—that of providing a refuge for the game of the surrounding country—would be destroyed by such a fence.

The best of all game fences for the Park are the forest reserves that have been created on its borders, supported and strengthened by a vigorous administration of the game laws in the surrounding States. It is entirely consistent with the function of the Park in the preservation of game that the animals reared under its protection should overflow into the surrounding regions where they may satisfy the natural desire of man for the sport of hunting.

CHAPTER VI.

FLORA OF THE YELLOWSTONE.

Considering its geographical location in the heart of the arid regions of the west, the Park is blessed with an unusually bountiful flora. Its climate is, in fact, much more humid than in any portion of the surrounding country. The mean annual precipitation at Mammoth Hot Springs for a period of ten years is nineteen inches. For the upper Park it is probably as high as twenty-five inches. The mean annual precipitation in the lower valleys surrounding the Park is about 14.5 inches. This greater humidity of the Park region produces a result upon vegetation that is very apparent. The forest growths are abundant, the flowers marvelously profuse and the grass nutritious and luxuriant. The Park is a vast oasis in the midst of a parched and arid country that stretches away from it in every direction for hundreds of miles.

The principal features of the Park flora which attract attention from the tourist are its forests and flowers and these will be separately considered in the next two chapters. Excelling them in practical utility, though seldom noticed except in the more beautiful glades and parks, are the various grasses which flourish everywhere outside of the dense forests. The importance of these grasses can not be overestimated. The very existence of the game depends upon them, and the convenience of visitors in subsisting their animals is greatly promoted thereby.

The Park grasses have never been separately catalogued, but they are practically the same as in the sur-

rounding country with the natural modifications due to difference of environment* As a general thing the grasses of the western country are of excellent quality. They retain their nutritive power in winter as well as summer, so that whenever the snow does not fall too deeply, grazing herds can find sustenance at all seasons of the year.

The three grasses that are the chief reliance for grazing are the gramma grass, the buffalo grass and the bunch grass. Gramma grass has a wide distribution throughout the west and is sometimes mistaken for buffalo grass. It attains a growth as high as ten inches. It is one of the native grasses that thrives under irrigation. Buffalo grass is also widely distributed, but is dying out before the advance of civilization. The bunch grass is most important of all, and is the main reliance of grazing herds both in winter and summer.

Besides the more important grazing grasses there are many other growths. Wild timothy and clover abound and the swamps are filled with rank growths which, in several places, have been mown and cured for hay. The quality, however, is very inferior.

The area of good pasturage in the Park is extensive, although it does not cover more than twenty per cent. of the entire Reservation. The principal open grassy tracts have been already described in the chapter on the topography of the Park. In the more open forests in the northeastern part of the Park the grasses invade the woods and form the most attractive places of all for grazing.

That singular and useless plant which grows almost universally throughout the arid west, the sage brush (*genus*

* Mr. Alfred Rydberg, in his catalogue of the Flora of Montana and the Yellowstone Park, enumerates 191 grasses. About 80 species have been reported from the Park, but the buffalo grass and gramma grass are not among them.

Artemisia) is represented in the Park by several species. The most common there, as elsewhere, is the *tridentata,* or three-pronged leaf. It grows extensively around Mammoth Hot Springs, where it attains a height of nearly ten feet. The growths in the higher altitudes are much smaller.

In the valley of the Lower Gardiner that other plant peculiar to the arid regions, the greasewood (*Sarcobatus vermiculatus*), flourishes. In external form it resembles the *tridentata* sage, but its color and composition are very different. The presence of sage brush indicates a good agricultural soil; that of greasewood a poor soil; though sometimes the two plants are found growing together.

The cactus is represented by two species, the well-known prickly pear, and the small spherical growth, which abounds in the lower prairies. Both of these plants produce attractive blossoms, and both are exceedingly troublesome to man and beast in traveling over the country where they exist. These plants flourish only in the lower altitudes of the Park.

Several well known species of wild fruits are met with. Red raspberries grow all along the northern boundary of the Park. In the region of the travertine rocks between Terrace Mountain and Bunsen Peak they grow in sufficient quantities to justify picking. Another place where they grow profusely is the Cañon of Lamar River, about six miles above the mouth of that stream.

Neither the black raspberry nor the common blackberry grows in the Park, but there are wild gooseberries and currants in abundance. The fragrant service berry is met with, but not the buffalo berry, which grows so abundantly in the valleys below the Park.

There is found all over the Park in the dense forests of lodge pole pine, a small plant which yields a diminutive

fruit of the cranberry genus. In taste and smell it resembles exactly the common huckleberry. It grows in the greatest profusion, and fills the air with its fragrance; but its exceedingly small size prevents its being gathered for use.

Among the minor plants which abound are some of the wild edible roots, such as the camas root, the Indian turnip, the bitter root, and the wild onion. Mushrooms grow extensively, and a certain variety attains enormous size. One specimen measured forty inches in circumference and weighed about ten pounds.

Lichens, mosses, and a few prostrate growths abound to a limited extent. Mint is found in some localities. There are but few vines and almost no thorny growths. Kinnikinick, or the bear berry, from the bark of which the Indian made a native tobacco, grows extensively throughout the forests.

The cultivation of ordinary domestic plants and vegetables in the Park is very precarious owing to the altitude and frequent frost. In the lower valley of the Gardiner the raising of vegetables has been successfully accomplished, but never on the Park Plateau, where the altitude is nearly half a mile greater. A novel system of hothouse cultivation has been successfully tried in the geyser basins where the steam from the hot springs has been utilized to force the growth of lettuce and similar vegetables.

CHAPTER VII.

FORESTS OF THE YELLOWSTONE.

The most prominent feature of the Park flora is its forest growth, which covers five-sixths of its area. The trees are nearly all conifera, but the species are few in number. Probably three-fourths of the forests consist of the lodge pole pine *(Pinus Murrayana)*, sometimes called black pine from its dark appearance in large masses. It grows in tall, straight, slender trunks, with no foliage, except near the top. The trees stand so close together that the lower limbs of earlier growths die out and the individual tree is simply a huge telegraph pole sixty to seventy feet long, with a Christmas tree on the top. In some places the growths are so dense and the trunks so weak and slender that when the top support is removed, as by cutting the right of way for a road, the trees lop over in great circles until the tops touch the ground. The tree is of little use for lumber, but it has been utilized extensively for fuel, telegraph poles, fences and similar purposes.

The white pine *(Pinus flexilis)* is found extensively in the lower altitudes in the north of the Park. It is seen at its best on the formation around Fort Yellowstone. It does not grow much above an elevation of 6,000 feet. It is not a very shapely tree, and is interesting rather from its sturdy form than from any real beauty or symmetry. It is of little use for lumber.

A related species *(Pinus albicaulis)* grows in the higher altitudes. In external appearance, habit and utility it resembles the flexilis pine.

The trees just mentioned constitute the only species of pines that grow in the Park. Three other important trees have also a wide area of growth. The Douglas Spruce *(Pseudotsuga macronata)* is a tree that resembles in external form of growth the pinus flexilis. It is found most abundantly in the northern portions of the Park, but to a considerable extent also in various other sections. In size of trunk it is by far the largest tree in the Park, occasional specimens exceeding six feet in diameter. It is the great lumber tree of the Park, and is always chosen in preference to other trees for bridge timber.

The two trees upon which the beauty of the Park forests mainly depends are the Engelmann Spruce and the Silver Fir, of the genera *Picea* and *Abies,* respectively. Both trees flourish in the higher altitudes, the spruce being partial to damp ground. Neither tree yields a good lumber, and neither is sought for this purpose when the Douglas Spruce is available.

The Engelmann spruce is a tall, well-built tree, with symmetrical branches—commencing but little above the ground, and generally drooping a little as if pressed down by the weight of many winters' snow. The bark is of a light reddish hue, which contrasts beautifully with the dark foliage.

The silver fir, sometimes called balsam, is also a tall symmetrical tree, whose soft, glaucous, light green foliage makes it the most beautiful tree in the woods. It is not generally found in dense growths, like the Engelmann spruce, but is encountered more frequently on the skirts of forests verging toward the timber line.

In a few instances these trees have assumed a remarkable growth, the limbs commencing with hedge-like density from the ground, and extending in a solid mass to the top

as if trimmed with artistic skill by an experienced gardener. There are several examples of these growths which should rank among the marvels of the Park. It is said that they have been utilized for shelter in the winter by chance wayfarers; for when covered with a roof of snow their interior is as dry and warm as the room of a house.

It is upon the two species just described that the beauty of the Park forests chiefly rests. The roads that are built through them are invariably cool and pleasant, and in some places form majestic avenues, with stately columns rising in perfect symmetry on either side. The visitor quickly learns the contrast between these rich evergreen forests and the somber solitudes of the lodge pole pine.

The Park boasts two species of cedar, the *Juniperus scopulorum,* and a prostrate form, *Juniperus sibirica.* The first is confined to the Lower Gardiner and the Yellowstone Valleys, and principally to the vicinity of Mammoth Hot Springs. This tree rarely attains sufficient size or regularity of form to make it useful for lumber or even fence posts. It is a small growth, misshapen in the extreme, and is attractive mainly on account of the remarkable contortions and unusual shapes it assumes. It is as if its entire life had been beset with wind and storm until it had lost every vestige of form and comeliness. There are, however, a few examples which exhibit remarkable symmetry of growth.

The prostrate cedar growth is found generally throughout the Park, at high as well as low altitudes. It creeps over the ground like a vine, and is a very ornamental shrub.

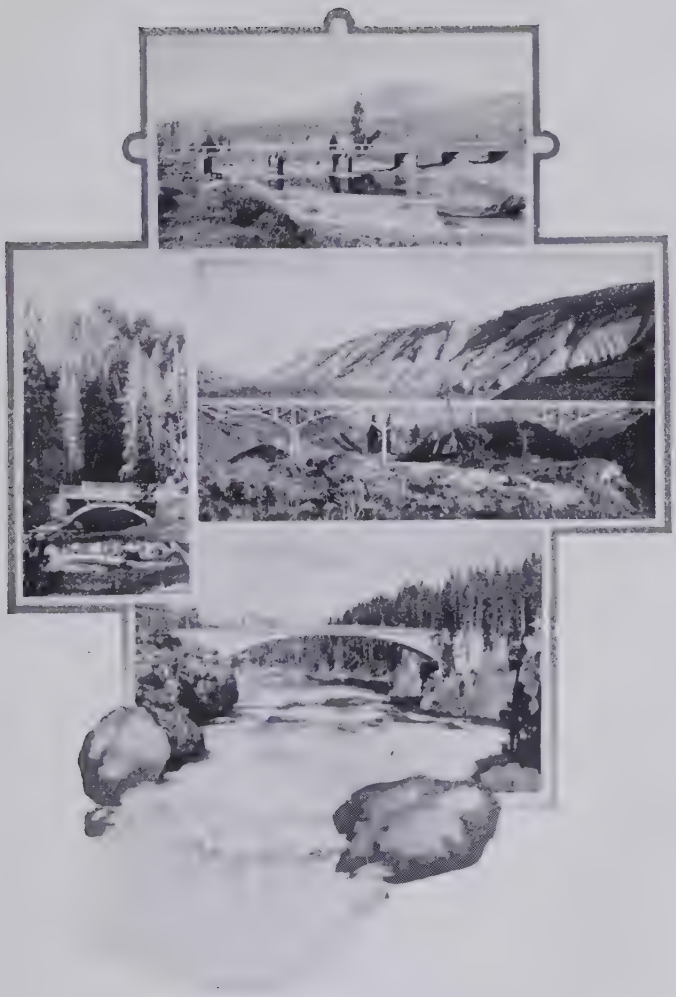
The genus *Populus* is represented in the Park by three species. The *angustifolia,* or narrow-leafed, cottonwood grows along the streams in the lower altitudes, but is not very abundant within the limits of the Park. There is

also a cottonwood of broader leaf, but of rather infrequent occurrence. The *tremuloides,* or quaking aspen, is the great representative of the genus in the Park, and the only deciduous tree to be found there abundantly. It grows in small detached copses in every part of the Reservation, and is an element of the highest importance in the beauty of the landscape. Whether in the soft, pale green of early spring or the pure crimson and yellow of early fall, these groves always appeal to the lover of nature as one of her choicest beauties. In certain localities the tree grows to a height of thirty or forty feet, with spreading tops and snow-white trunks—a singular and striking phenomenon, like a group of ponderous umbrellas with white handles and green tops.

The elk and deer browse the quaking aspen, and the beaver cuts it down for his use; so that between the two it has a hard struggle for existence in some localities. Whether from browsing or some other cause, many of the groves in the northern part of the Park seem to be trimmed up exactly the same distance from the ground, as if all the limbs had been carefully cut off at a fixed height.

The species above described include all the larger trees of the Park. There are besides several smaller growths and numerous low shrubs that are scarcely to be considered as forming a part of the forest. Willow thickets abound on nearly all the streams, and in some places, as in Willow Park, are very beautiful either in early spring or late autumn. The willows are naturally a great resource for the beaver in his peculiar manner of life. Alder growths abound on nearly all the streams. The dwarf maple is quite common around Mammoth Hot Springs, and is a very pretty tree.

Considered in their broader bearing upon the welfare of



Group of Park Bridges.

the Park, its forests are an element of great importance. Their value differs with the different species, and in some instances is much overestimated. In the vast compact areas of lodge pole pine there is nothing of beauty and little of utility. The dense shade prevents the growth of grass and underbrush, and the game find nothing to live on among them. The spruce and fir are very different trees. They grow more in detached masses, interspersed with pasturage which often invades their precincts with a fine grassy turf, forming ideal grazing grounds for the herbivorous game. As seen in their native beauty on the slopes of Mt. Washburn they are one of the chief attractions of the Park.

As a source of timber supply the forests of the Park and surrounding mountains are not of high rank. Only one of their trees yields a good lumber, and that, unfortunately, is among the least abundant. Railroads are now resorting to the lodge pole pine for ties and telegraph poles, but this due to necessity from the growing scarcity of better timber rather than to any merit in the wood itself.

The influence of the Park forests upon the flow of its streams is very different from what is generally supposed. So far as the spring floods are concerned, the effect of the forests, contrary to the received opinion, is to intensify, not to moderate. This is a truth that has been fully demonstrated from many years' observations in connection with the opening of the roads in the spring. The same observations also indicate that, so far as snowfall is concerned, an open country is more conducive to uniformity of flow and a prolonged supply extending well into the summer than is a forest covered area. The broader question of how far forests have an influence upon precipitation is one about which there is much uncertainty, but the consensus

of opinion is that it is favorable, and that the forests serve on the whole as great natural reservoirs in creating and conserving the supply of water.

The preservation of the Park forests has always been a matter of anxious solicitude on the part of the authorities. Extreme precautions are taken to prevent fires, and severe penalties are visited upon anyone who is careless in this respect.

Forest fires in the Park arise from two principal causes —lightning and the agency of man. It is said that they have been started from the friction of trees rubbing together in the wind; but this is very improbable.

Lightning is undoubtedly a frequent cause of fires, and one which can not be eliminated. The thunder showers of the Park are characterized by intense electrical activity and lightning strokes are frequent and severe. These strokes often take place when there is very little rain—not enough to extinguish any fire that might be started. The danger is therefore a formidable one, and unhappily one that will always continue.

In like manner the agency of man in causing forest fires dates from the indefinite past, and will never be wholly eliminated. It is thought by many that this danger is greater now than it used to be, but this is probably not true of the Park, from which railroads and settlements are excluded. The Indians and trappers of early days who wandered through this region were not confronted with "extinguish your fires" at every turn, and were not afraid of the guard house if they left smoldering coals behind them. Probably their camp fires caused quite as many conflagrations as those of tourists do now.

The control of a forest fire that has once gotten under way is next to impossible except by the aid of rain. The

fire does not travel on the ground, as on the prairie or in a forest of deciduous trees. In the Park there is not generally enough material of the right character on the ground to enable a fire to gain dangerous headway. The real progress is through the tree tops. The fire leaps up among the resinous cones and leaves, which are torn off in flames, borne on the wind for hundreds of feet, where they start new fires, and the process is repeated indefinitely.

It is impossible to battle successfully with an enemy like this, who travels through the air and laughs at the efforts made to circumvent him. Only at night or in the early morning is there the least possibility of making effective headway against him. The chill air dampens the fury of the fire, and it ceases to run from about evening twilight until nine or ten o'clock in the morning. The fiercest progress is from two to four o'clock in the afternoon, when the heat and wind are at their maximum. The volume of smoke given off by these forest fires is very dense and heavy, and gives an exaggerated impression of their magnitude.

The proportion of the Park territory which has been burned over in the past three hundred years is almost as great as the Park itself. Evidences of former fires abound everywhere, from the dead timber of last year's conflagration to full grown forests which still show on close inspection charred remains that have resisted the decay of time. The charring of wood gives it a wonderful preservative power, amounting in some instances to practical indestructibility. It is, therefore, a simple matter to trace these fires, and with some definite starting point or datum it is comparatively easy to estimate their relative ages. Fortunately we have such a datum which not only serves our present purposes, but gives a clew to the origin of one

of the most important geographical names of the Park. In the journal of a clerk of the American Fur Company,* who spent the years 1830-35 in the country around the Park, the fact is recorded that the name "Burnt Hole," or its equivalent, Firehole, arose from a great forest fire that swept over this region a "few years before." The name itself was applied then, as now, to the Firehole Geyser Basins. This fire must have been as late as 1826, for it was not until then that American trappers began to frequent this region, and were there to note the facts. Its remains are still everywhere visible, and the process of decay, as compared with other traceable fire effects, is certainly not more than half completed. The trunks of trees that were killed three-quarters of a century ago still retain their form, though shattered by decay; while in many other places they have returned completely to the mother earth, and full grown trees rise above them, with only a charred remnant here and there to record the story of the past.

The burned areas generally grow up again, though rarely to their full extent, and the ultimate result of every fire is probably to diminish the forest area. The young pine thickets are exceedingly dense and a large proportion of the trees die out in the process of growth. The down timber resulting from forest fires is a great obstacle to travel and renders the country in many places absolutely impassable on horseback.

To what extent these forest fires are an injury to the Park it is impossible to say. If they could come in the right spots through the southern and central portions of the Park and leave us more pasturage where the lodge pole pine now holds sway, the Park would be the gainer. If it

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* See Page 38.

Ornamental Forest Growths.

were possible to break up these dense masses into smaller groups like those around Mt. Washburn, every benefit that flows from the forests would still obtain, the landscape would be beautified, the game pasturage would be increased, while the open spaces would facilitate the arrest of such fires as might break out.

But there is no obvious way of accomplishing this result within any reasonable cost. Certainly the forest fire is not one. It is as liable to break out in the wrong place as in the right one. It creates a devastated area which for years is a blot upon the landscape. This is followed by a generation of down timber aggravated by impenetrable growths of jack pine, and the final outcome, after a century or two of time, is a forest like that which was destroyed. If it were ever considered desirable to thin out the forests in any portion of the Park it would have to be done by artificial means. The government may yet find it to its advantage to permit certain sections to be deforested and turned into pasturage, but it will never be found practicable to utilize forest fires for this purpose.

CHAPTER VIII.

THE FLOWERS OF THE PARK.

Occasionally a visitor comes to the Yellowstone with a very literal idea of what is meant by the word park. He is looking for beautifully aligned walks and roadways, carpet-like lawns, formal beds of flowers, and other features of the conventional city park. With something of a shock he encounters the actual reality as it exists where the majority of tourists enter the Park, and it does indeed seem, at first sight, as if the name was a little out of place when applied to such a region.

But if this country as a whole seems more like a wonderland than a park, there are hundreds of genuine parks scattered all through it. The traveler who leaves the main road to follow one of the many trails that lead through the woods to some distant mountain peak is sure, in time, to come upon spots more picturesque and beautiful than anything art can produce. Take, for example, a sparsely wooded glade on the slope of Mt. Washburn, carpeted with the numerous native grasses and threaded by a silver rivulet from the melting snows above. Fir and spruce, in dark evergreen masses, contrast with the soft green of the quaking aspen or the mellow brown of certain characteristic shrubs. Here and there, perchance, lie prostrate forms of forest trees, returning, by the slow process of decay, to the soil from which they sprung. Everywhere, in contrast, the animating presence of life, "laughing with joy for its wild freedom," reflects the abounding health and vigor of Nature. Far upward, through the openings

of the trees, the mountain stands forth in silent majesty, while over it the white clouds are winging their way across the canopy of the deep blue sky.

But there remains to be mentioned the most attractive feature of the picture and the one that gives the finishing touch to its beauty—the native wild flowers. The Yellowstone Park is, in fact, one vast garden of flowers. They grow almost everywhere, and one rarely finds a spot so sterile that Nature has failed to beautify it with some simple blossom. They lift their heads almost from under the melting drifts, and they persist in the fall until the snow crushes them to the ground. They seem all to come at once, for their time is short, and has to be improved while it lasts. Their beauty, moreover, increases with the hardness of their environment, and the most exquisite tints are found in those lofty and exposed situations where the conditions of growth seem most unfavorable. One of the pleasantest surprises to visitors who ascend any of the high mountains is in finding the permanent snow banks bordered with banks of flowers, so dense and rich as to paint the ground with their color.

With few exceptions, the flowers of the Park are not particularly fragrant, and, like all wild flowers, they wilt quickly in the hand, but revive in water, and can thus be preserved for a considerable time. When skillfully combined by an artist in that kind of work, and interspersed with grasses and leaves, they yield more exquisite bouquets than can be made from cultivated flowers.

To the true lover of Nature the flowers of the Park will always be one of its greatest attractions. The unique phenomena of this region produce a vivid impression by their very strangeness, but it is not an impression that lasts. One quickly wearies of anything that exists in

apparent violence of the orderly course of Nature, and he finds a more enduring satisfaction in common things, like the wild flowers of forest or mountain. Theirs is a charm that never grows old; their sweet influence never ceases; and they return in fresh radiance with every spring to remind us anew of life's beauty.

It would be quite impossible, within the limits of this chapter, to give a full description of the flowers of the Park, for they run well up into the hundreds. We shall note about sixty of the more important species—those which the visitor is sure to see on his tour, particularly if made in the latter part of June or the first half of July. There are a few species that disappear early in the season, and a considerable number that are gone before the first of August; but, owing to the range of altitude, a large proportion of the flowers can be found in one locality or another nearly the entire season. In the following list the popular and generic names are given in most cases, but the specific names are, with few exceptions, omitted.

Among the early arrivals the most beautiful is the Bitter-root *(Lewisia rediviva)*. Because of the infrequency of warm, early springs in the Park, this flower is not always abundant there; but under favorable conditions it fairly covers the hillsides near Mammoth Hot Springs, and in the lower altitudes, with its delicate pink blossoms. It is an exquisite star-shaped flower, growing close to the ground, and is unusual in having no green in stem or calyx, which are of the pink of the flower, tipped with brown. The root of this plant was extensively used by the Indians for food.

The Bitter-root has been chosen as the State flower of Montana.

The Lungwort *(Mertensia)* is another early arrival, and

its large blue clusters grow in profusion on the hills between Mammoth Hot Springs and the Golden Gate.

A flower that is seen almost everywhere in the early spring, soon after the snow disappears, is the Phlox, of which there are at least six recognized species in the Park. It grows close to the ground in compact masses, which form mats of delicately tinted blossoms. It is one of the few wild flowers that possess a genuine fragrance, and its odor fills the air wherever it grows. Its color shades from white to every delicate tint of lavender and pink, producing exquisite effects. A peculiarity of this flower is that it gains a quick foothold on the newly made grades along the tourist route.

Violets are found in six or seven distinct species; but their season is short and very early, and as they choose secluded spots for their blooming, they are not often seen by tourists.

Probably the most abundant flower in the Park is the Lupine *(Lupinus,* in six species.) It is found in almost every locality, and grows in masses on the grassy hillsides in every shade of color—from a lavender so pale as to be almost white, to the deepest blue or purple. Its graceful form and variety of tint are its chief attractions.

The bright blue of the Larkspur *(Delphinium,* in five species) is likewise found everywhere throughout the Park. It is dreaded by stockmen as a plant poisonous to sheep and cattle.

That somber and appropriately-named plant the Monk's-hood, or Wolfsbane *(Aconitum),* is also poisonous. It flourishes best in the higher altitudes, and in damp ground. The body of the blossom is white, but it is so deeply varied with purple as to give the color-character to the flower.

A flower which grows in fascinating variety throughout the Park, and is a particular favorite with many, is the Indian Paint Brush *(Castilleja)*, also called the Painted Cup or Indian Pink. It is found almost everywhere. In the lower altitudes it takes on all the shades of Indian red —the color it is best known by in other regions. But it is in the higher altitudes, well up toward the mountain peaks, that it is to be seen in its greatest beauty. Here it assumes a very different dress, and attains a perfection of size, form and color which the other varieties hardly suggest. It is generally of a deep rose or crimson, like an American Beauty, but ranges through every shade of these particular colors. It is an interesting fact that the real blossom of this brilliant plant is so small as to be scarcely perceptible. What gives it its wealth of color is the leaf which grows in thick clusters at the top of the stem, to protect the tiny blossoms it conceals.

The Forget-me-not is another characteristic flower of the Park. The true forget-me-not *(Myosotis alpestris)* is found only at high altitudes, almost at the mountain summits, in fact. Here it is of a deep blue and grows in thick clusters close to the ground. Lower down occurs what seems to be another variety of the same flower, more beautiful, without doubt, than the first. It grows much taller, in branching, feathery clusters, and is of a paler blue, though of the same rare tint—the tint that one always associates with this particular flower. It seems, in fact, to respond to one's idea of what a forget-me-not should be, but botanists tell us that it belongs to a different genus *(Lappula)*. It sometimes grows in such abundance as to impart its color to the hillside.

Another flower of this same rare blue is the wild flax

(Linum Lewisii). It is exquisite but perishable, the petals falling easily at the approach of midday. It is found everywhere throughout the Park.

What is considered by many the most beautiful flower in the Park is the Columbine *(Aquilegia)*. Certainly, in grace of form and delicacy of coloring it is unsurpassed. The varied tints of these dainty flowers elude description. The palest are cream-white, and the others seem made up of every faint shade of yellow, pink, blue and purple. The plant grows about a foot high, with pendent blossom, swinging like a bell from its slender stem. It flourishes best in the open forests at high altitudes, and its favorite habitat is Mt. Washburn.

An experienced collector of Park flowers has called the fringed gentian *(Gentiana elegans)*, "the characteristic flower of the Park as well as the most beautiful." While this is perhaps too sweeping a claim, the flower is certainly very abundant and of great beauty. It grows in the moist places of the geyser basins and in the mountain meadows everywhere. Its deep rich blue color is found in no other flower, and there are few flowers which, on close inspection, displays so fine a texture. It differs in size from the gentian of the east, being slightly smaller. It flourishes in great beauty around the Upper Geyser Basin, where there have been found specimens of a pure white.

The Immortelle, or Everlasting of the East *(Anaphalis)* is quite common. It is a sub-alpine plant, and its blossom is of a delicate, velvety white. Properly cared for it retains its beauty for an indefinite period.

The Sulphur Flower or Umbrella Plant (*Eriogonum*, five or six species) grows in great profusion through the moun-

tain portions of the Park—sometimes fairly covering the hillsides with its varied shades of cream white, sulphur, yellow and red.

The wild Geranium, cranesbill magenta *(Geranium)* grows profusely along the roadside. It is conspicuous because of the strong magenta color of its blossoms; but it can hardly be called a beautiful flower. The leaves of the plant turn red in autumn.

The Harebell *(Campanula rotundifolia)* is an abundant flower. It grows in clusters along the roadside everywhere and is dainty and beautiful here as in other regions.

One of the most brilliant and effective of all the flowers, through more rarely seen than many others, is the Blue Penstemon, Beard Tongue *(Penstemon,* there are no fewer than thirteen species of this genus in the Park). Its long stem, growing from six inches to two feet or more in height, holds clusters of trumpet-shaped bells of an indescribably rich blue, often tinged at the base with wine color. It is seen rather sparsely scattered in dry places near the roads.

A plant most characteristic of the Park, and a conspicuous ornament in the landscape at all seasons, is the Fire Weed or Willow Herb *(Epilobium).* When in bloom, its long clusters of a peculiar magenta pink, on stems from a foot to five feet in height, decorate the roadway and hillside in all localities, and when the blossoms have passed, the leaves take on a brilliant red, and are an important element in the autumnal coloring. This plant takes its name from its tendency to grow in localities that have been devastated by fire.

Clinging to the rocks around Golden Gate, often where there is no visible soil, may be seen the Evening Primrose, or Rock Rose *(Oenothera,* four species*).* Its large beau-

Northern Entrance to Park.

tiful blossoms open at sunset and close about noon. They are white at first, but gradually turn a deep rose pink. The roots of the plant are long, as if going deep in their search for water. These flowers are very interesting in their habit of growth—bright, little bouquets hanging up in the rocks. Fortunately, their period of flowering is a long one.

One of the daintiest of all the flowers, and one somewhat resembling the Columbine in grace of form, is the yellow Adder's Tongue *(Erythronium)*. This has been called the Dogtooth Violet, surely a gross misnomer. In California it is most appropriately called the Easter Lily, but Easter has long passed before it makes its appearance in the Park. There is no gayer sight than a mass of these yellow lilies, as one comes upon them in the woods under some spreading tree—as "jocund company" as are the daffodils which inspired Wordsworth's immortal lines.

The Mountain Primrose *(Primula)* is a brilliant, crimson, bell-shaped flower on long branching stems, growing close to the water's edge along the mountain streams. It is not abundant and is rarely seen by tourists, except in Spring Creek Cañon, on the road from the Upper Geyser Basin to the Yellowstone Lake.

The *Pyrolla* (five species) is a little flower, so rare that it perhaps hardly deserves a place in this short list, but its beauty is of such rare quality as to justify including it. It resembles in size and general appearance the Lily of the Valley, and is found in the woods about Yellowstone Lake.

The Monkey-face *(Mimulus)* is a bright little yellow flower growing in wet places at the edge of streams.

That wonderful, night blooming flower *(Mentzelia)* is considered by some the most beautiful in the Rocky Moun-

tains. It is not well known because it chooses as its habitat only the most desolate and arid spots, and because its blossoms can be seen only at night. The plant somewhat resembles a thistle and would not win a second glance from the passer-by in the day time when its marvelous satin-like blossom is tight-folded in its bed of grayish green. When open at night it exhales a rich, heavy perfume which, like the gleaming white of its blossom, attracts night-flying insects.

This flower is found quite abundantly below Mammoth Hot Springs, and is locally known as the Night Blooming Cereus; but this name properly applies only to a tropical cactus, *Cereus grandiflorus.*

The Yellow Water Lily *(Nymphae polysepala)* is found in great abundance in some of the lakes and ponds. It is particularly noticeable in the little pond at the first crossing of the Continental Divide above the Upper Geyser Basin.

The Aster, in not fewer than twelve distinct species, is found everywhere throughout the Park and during the entire season. It is one of the first flowers of spring and the last to disappear in the fall.

The Sunflower *(Helianthus)* is represented by several species and grows in great profusion, as does also the allied genus *Helianthella.*

Besides the flowers briefly described above, the following may be mentioned as among those which are quite sure to fall under the eye of the tourist:

The Anemone or Wind Flower *(Anemone* in two species*)*; the Pasque flower *(Pulsatilla hirsutissima)*; the Arnica plant *(Arnica,* seven species), a bright yellow flower growing in the shade of evergreen trees; the Buttercup *(Ranunculus)* in at least thirteen different species;

two flowers, the Marsh Mallow *(Caltha leptosepala)*, and the Globe Flower *(Trollius albiflorus)*, of the same family and growing in the same environment; the Shooting-star or American Cowslip *(Dodecatheon,* in four species), a beautiful flower of wide distribution; the Prickly Pear *(Opuntia polyacantha)* which has a delicate and beautiful blossom; the Double Bladder-pod *(Physaria)*, one of many representatives of the Mustard family; Jacob's Ladder, or Greek Valerian *(Polymonium,* in four species); the Golden Rod *(Solidago,* in five species); that beautiful resident of high altitudes, *Townsendii,* in five species; the *Clematis Douglasii,* more beautiful in seed than in flower; the *Douglasii Montana,* an exquisite little pink flower, of the Primrose family which grows in great profusion in certain localities; the Spring Beauty *(Claytonia)*, and the Thistle *(Carduus* in two species).

Among the flowering shrubs and vines the more prominent are:

The Wild Rose, which is present in great abundance in the lower altitudes and is conspicuous both for its beautiful blossoms in spring and its scarcely less beautiful foliage in fall; the Spirea; the Shad Bush, or Service Berry, which is covered with white flowers in spring; the Mountain Ash, the Labrador and New Jersey tea plants, the several varieties of berry bushes, and the Strawberry plant which grows all over the Park.

There are several representatives of the fern family in the Park, the most important being the *Cystopteris fragilis,* which has a general distribution throughout the reservation.

The beautiful but destructive parasite, the Mistletoe, is found on the lodge pole pine.

The Orchid family has numerous representatives in the

Park, the most important being the *Calypso bulbosa* or *borealis.*

There are many trees and shrubs in the Park, some of which are described in the two preceding chapters, that yield such beautiful autumnal foliage as almost to entitle them to be classed with the flowers. Among the more conspicuous are the Quaking Aspen, the Red Osier or Dogwood *(Cornus stolonifera)*, the Oregon Grape *(Berberis agrifolium)*, valued for its medicinal qualities, and the Nine-bark *(Opulaster pauciflorus)*.

Several of the grasses are exceedingly beautiful in their season of blossom, and, like the autumn leaves, deserve to be considered with the flowers.

It may be added that certain domestic flowers grow unusually well under cultivation in the Park. This is particularly true of Pansies, which attain a size of blossom and a richness of coloring unsurpassed anywhere.

CHAPTER IX.

THE CLIMATE OF THE PARK.

Take it in all its phases, year in and year out, the climate of the Park is as delightful and health giving as it is possible to find. None of the ordinary causes of disease which pervade the atmosphere or reside in the water in lower altitudes are found here. There are no great extremes of heat and cold, or of moisture or drought.

Table of Mean Monthly Temperatures, Fahrenheit, Based upon ten years' observations (1891-1900).

MONTH.	Yellowstone Park.	New York City.	New Orleans.	St. Louis.	St. Paul.	Chicago.	Salt Lake City.
January	18.3	30.6	53.0	32.2	13.3	23.6	29.4
February	19.1	30.9	55.8	33.0	14.2	24.1	31.5
March	22.6	37.8	62.6	43.5	26.4	33.3	40.2
April	35.2	49.4	68.6	57.8	46.9	46.9	49.1
May	44.1	60.0	75.5	66.4	57.8	56.7	57.1
June	54.8	69.6	80.1	76.2	67.8	67.4	66.4
July	61.2	73.8	81.7	78.3	71.8	72.0	74.4
August	61.1	73.7	82.0	78.5	70.3	71.6	74.3
September	52.3	67.5	79.3	72.6	62.7	65.8	64.8
October	40.4	56.0	70.5	59.9	49.6	53.5	52.0
November	26.5	45.0	61.7	44.8	29.2	37.3	41.8
December	20.4	35.6	55.4	36.5	19.8	28.6	30.4

The Park temperatures are for Mammoth Hot Springs.

The air is clear, electrical and bracing, the nights always cool, the altitude exhilarating, the odor of the evergreen forests invigorating, while the varied and beautiful scenery exalts the mind and diverts attention from cares which are often the real cause of physical ills. In the broadest and highest sense the Park is a sanitarium which rarely fails to give substantial benefits to those who seek them.

The preceding table gives the mean monthly temperature for the ten years, 1891-1900, in the Yellowstone Park and in several of the largest cities of the United States. The Park temperatures are for Mammoth Hot Springs. For the general plateau, which averages 1,500 feet higher, these figures should be diminished by at least ten degrees. In the middle of the day and under the direct influence of the sun, August temperatures sometimes reach ninety degrees. But no such heat pervades the general atmosphere, and in the shade the air always seems cool. Night temperatures at Mammoth Hot Springs rarely exceed sixty degrees, and in the Upper Park scarcely a week passes without frost.

The winter temperatures of the Park, so far as they have been regularly observed, are much less extreme than is generally supposed. The impression prevails that the Park in winter is a veritable section from the Polar Regions. The facts are wholly different. Mammoth Hot Springs has wonderfully mild and temperate winters. The proportion of clear days which characterizes its summers is equaled if not exceeded by those of its winters. The snowfall never reaches a depth that blockades travel, if there is any determined effort to keep the roads open.

In the upper Park the weather is much colder and the snowfall much greater. The mean annual fall (light) at

Mammoth Hot Springs for the ten years, 1890-1900, was 8.6 feet, with a maximum of 12.3 feet and a minimum of 5.5 feet. In the upper park it doubtless amounts to twenty feet. Its weight often destroys bridge railings and light buildings, and it shows its effects everywhere upon forest trees. Drifts accumulate in enormous magnitude and numberless avalanches fall from the mountain sides every winter. Nevertheless it is not until late in the winter that the fall of the snow really blockades travel, and it would doubtless be possible to maintain open roads the year round. The great depth of the light fall of snow conveys an exaggerated idea of its real depth. It settles rapidly and evaporates like water in the summer time. Even with the temperature below the freezing point the snow disappears with very noticeable progress.

The winter climate at Mammoth Hot Springs is undoubtedly more healthy for northern people than the southern resorts which are so much patronized. In the Park the conditions of genuine winter are expected and provided for. Heating and clothing are adapted to the climate. In the so-called winter resorts there is too little cold to make winter provision for, and too much to be comfortable without it; so that a great deal of the expected pleasure and benefit of the milder climate never materializes. In the Park there is everything that a lover of genuine winter desires—unlimited opportunity for skating, coasting, snow-shoeing and sleighing; crisp clear air; beautiful snowstorms; fine winter scenery; and as pure and perfect an atmosphere as exists on the globe.

On the whole, the Park climate, both in summer and winter, is thoroughly tonic in its effect upon the system. These benefits are probably more noticeable after three or four months' sojourn than for much shorter or longer

periods. As a place for continued residence the altitude is too high for most constitutions, but as a place to go for a few months' rest and recuperation it has no equal.

A matter which has naturally attracted considerable inquiry is the therapeutic value of the mineral springs of the Park. The superstitious faith in the efficacy of mineral waters to restore health, which has characterized mankind in all ages, caused the physically afflicted to hail the discovery of this region as the promised fountain of new life. The first explorers to ascend the Gardiner in 1871 found "numbers of invalids" encamped on its banks, where the hot waters from Mammoth Hot Springs enter that stream; and it is recorded that "they were most emphatic in their favorable expressions in regard to their sanitary effects."

But this impression was very evanescent. No one now goes to the Park because of its mineral waters. Nevertheless, it would be premature to assume that there is no medicinal virtue in them. There is in the Park almost every variety of mineral spring; there are abundant and luxurious waters for bathing; and it is not at all improbable that the opportunities afforded in this region may yet be utilized to the great advantage of the public.*

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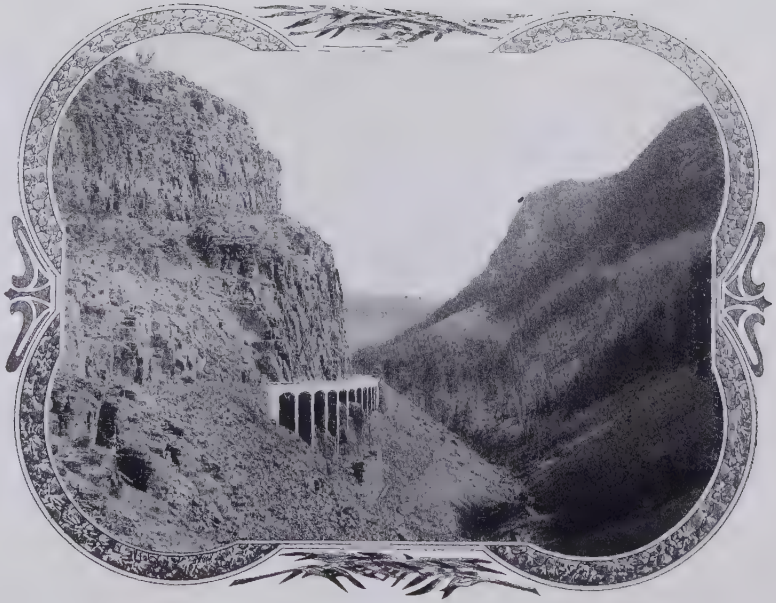
* For analysis of Park waters see page 219.



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CHAPTER X.

ROADS, HOTELS AND TRANSPORTATION.

The Park is a very extensive tract of country and its points of interest are widely separated from each other. The ordinary tour requires about 150 miles of travel and one week's time. The question of ways and means of making it in comfort is an all-important one; for if the roads are bad, the hotels ill-kept, or the transportation uncomfortable, the physical discomforts resulting detract largely from the pleasure of a visit.

The road system of the Park is designed to provide an entrance on each of the four sides, and to give access to all the more important objects of interest. The mileage of all the roads within the original reservation is about 306 miles; that of connecting roads in the forest reserves, built and maintained by the government, about 111 miles; making a total of 417 miles. This mileage may be extended in the future, although it is the present policy not to multiply the roads, but to restrict them as much as possible, leaving the larger area of the Park free from this form of civilized intrusion.

When it is considered that these roads are in the heart of the mountains, where the country is wild and rugged, it will be understood that the problem of working out a satisfactory system is a very large one. Many things have to be considered that ordinary railroad work is free of. Questions of drainage, dust, character of road bed are much more exacting in highway construction. It is only because its shorter curves and heavier grades give greater flexibility of location, thus avoiding heavy cuts and fills,

long tunnels and high bridges, that the cost of a first-class modern highway is not greater, mile for mile, than that of a railroad through the same country. The full magnitude of the Park road system as an engineering work has never been appreciated by the public and only very recently has Congress recognized it in any adequate degree.

The first person to submit an official project for a road system in the Park was N. P. Langford, first Superintendent. In his annual report for 1872 he presented an outline of what was then urgently required and asked for an appropriation from Congress. Nothing was done, however, until 1877, when Congress gave $15,000 to commence the work. P. W. Norris had succeeded Mr. Langford as Superintendent and to him fell the task of building the first government roads in the Park. He opened up a great extent of country in the next four years, expending for this and other purposes nearly $70,000. The work was very primitive in character, no attention being given to proper location and but little to proper construction. It has all been since abandoned.

In 1883 the government sent an officer of the Corps of Engineers to take charge of the work and by him the general project for the existing system was prepared. From that time on, for many years, Congress gave small annual appropriations, a portion of which was used in the building of roads. The usual annual appropriation was $40,000. In the year 1902 Congress definitely adopted an estimate for the work and pledged the sum of $750,000, to be given in three equal annual instalments. The work has remained in charge of the Corps of Engineers except during the four years from 1894 to 1898. It was definitely placed under the Engineer Department by Act of Congress of June 6, 1900.

The road system of the Park, as it is now worked out, embraces a general circuit or belt line connecting all the important centers of interest; four approaches or entrances, one on each side of the Park, numerous side roads to isolated objects of interest; and bridle trails through sections of the Park where roads are not likely to be built.

The main circuit of the system includes the following localities, which are the six great centers of attraction in the Park: Mammoth Hot Springs, Norris Geyser Basin, the Firehole Geyser Basins, Yellowstone Lake, the Grand Cañon of the Yellowstone, and the country around Tower Falls. Between the east and west sides of the circuit, where they approach nearest each other, there is a cross-road, extending from Norris to the Grand Cañon. The total mileage of the belt line and of this cross-road is 152 miles.

The most important of the approaches is that from the north, where the Northern Pacific Railroad touches the border of the Park. The distance from this point to the belt line at Mammoth Hot Springs is five miles.

The eastern approach lies partly within the Park and partly in the Yellowstone Forest Reserve. It connects with the Burlington Railway system and leads from the valley of Shoshone River through Sylvan Pass to the belt line at the Lake outlet. It is 59 miles long, of which distance 31 miles is within the Park.

The southern approach lies partly in the Park and partly in the Yellowstone Forest Reserve. It has at present no direct connection with any railroad. Its initial point may be taken at the confluence of Snake River and Buffalo Fork, whence it extends up the valley of Snake River to Lewis Lake and across the Continental Divide to

the belt line on the west shore of Yellowstone Lake. Its length is 52 miles, of which 23 miles is within the Park.

The western approach lies entirely in the valley of the Madison River and its two tributaries, the Gibbon and Firehole. It forks at the confluence of these two streams and a branch ascends each until it intersects the belt line. The length of this approach, including the two branches, is 20 miles, all of which lies within the Park. It is by this approach that traffic coming from the Oregon Short Line Railroad (Union Pacific) enters the Park.

The principal side roads of the Park are the following: To the Middle Gardiner Falls and around Bunsen Peak; to the great Fountain Geyser in the Lower Basin; through the various points of interest in the Upper Basin; to Sulphur Mountain in Hayden Valley; to Artist Point on the right bank of the Grand Cañon; to Inspiration Point on the left bank; to the summit of Mt. Washburn from Dunraven Pass; and up the valleys of Lamar River and Soda Butte Creek to the northeast corner of the Park. The total mileage of these roads is about 74 miles.

The country through which the Park roads are built is rough and mountainous, largely covered with dense forests, intersected with a net work of streams, and lying at an altitude where the snow falls to a great depth. The soil is a heterogeneous mixture of a great variety of substances which are for the most part unfit for road building. The rock is nearly all of a volcanic character and with few exceptions too soft for a satisfactory macadam. Beds of valuable gravel occur at too rare intervals for general use as a surfacing material. The streams are torrential in character and subject to heavy freshets in the spring. There are over sixty bridges and five hundred culverts. But in spite of this evidence of the great abund-

ance of water, the chief drawback to the roads is its absence in the right place; for the drought of summer never fails to bring with it a dusty road bed. The natural conditions for road building and maintenance in the Park are thus seen to be not the most desirable.

In later years careful attention has been given to the location of the roads, an important consideration always being to carry them where they will develop the scenery of the Park to the best advantage. The final locations are not everywhere what they ought to be, for in the earlier work very little attention was paid to this matter, and in later years the desire to save cost has caused the retention of several faulty pieces of work.

In the work of construction, the right of way through timber is taken at thirty feet, except in a few places where it has been widened to facilitate the melting of snow. The surface width of the road on the main circuit is fixed at eighteen feet and the limiting gradient at eight feet in the hundred. On this portion of the system the bridges are all to be of steel or masonry and the culverts vitrified clay pipe. The surface is to be metaled with crushed rock or gravel, and to be sprinkled during the dry season with water or oil. This higher character of work extends also to the northern approach which is subjected to the heaviest traffic of any of the Park roads.

The work on the other approaches and on the side roads is of a less substantial and costly character. A steeper gradient and narrower width are permitted; the surface will not be macadamized or sprinkled in the near future; and wood will be used in the structures.

Over the entire system mile-posts of turned cedar are provided. They are numbered on opposite sides with the nearest full miles to the next important stopping place.

Suitable sign-boards are placed at all junction points, and at the more notable objects of interest.

Among the more interesting, difficult and costly pieces of work are the following: The road through the Lower Gardiner Cañon; the passage of the Travertine Rocks, two miles and a half above Mammoth Hot Springs; the cliff road in Golden Gate Cañon; the water grade in Gibbon Cañon; Spring Creek Cañon, Craig Pass and Corkscrew Hill on the Continental Divide Road; the road along the Rapids of the Yellowstone; the side road to the summit of Mt. Washburn; the cliff road at Tower Falls; the road through the East Gardiner Cañon; and the crossing of Sylvan Pass on the Eastern Approach.

The principal structures are: The entrance gate at the north boundary; the Golden Gate Viaduct; the Melan Arch Bridge over the Rapids of the Yellowstone; the wooden arch bridge over a dry ravine in the same vicinity; a steel arch bridge over Cascade Creek; the new Baronett Bridge over the Yellowstone; the arch bridge over Tower Creek; and the five-span steel arch over the Middle Gardiner.

Such, in its main feature is the road system of the Park as assured in the immediate future. It must not be supposed, however, that this will be the limit of government endeavor to build up here the finest system of mountain roads in the world; and we may be pardoned for stepping ahead into the future and forecasting what the final development of this road system should be.

The present location will never be changed except in minor details. The width of the roads should be gradually increased; the improvement of the surface should be carried on until a rock road bed is everywhere secured; the means of laying dust should be developed to the highest possible efficiency; strong guard walls should be built along

all side hill grades; the dead and decaying timber should be cleared away from the roads to a distance of 100 feet, the trees thinned out, and grass and shrubbery introduced to beautify the roadside and induce game to show themselves; the structures should be built, as far as possible, of rustic design in the rough native stone, and all other work should be carried out with due reference to the purpose of the roads as public highways in the world's greatest of natural parks. The opportunities for artistic work in harmony with the surroundings are almost endless, and it is to those who are to follow after the pioneer work is done that the real satisfaction of definite results will come.

It is the ultimate realization of an end like this that will permanently exclude railroads from the Park. The only real argument in their favor now is the discomfort of coach travel arising from the condition of the roads. The final result will be a matter of considerable time; but it will come; and if the present policy is adhered to, future generations will commend that wisdom which excluded from this region the innovations of modern travel, and left one place in the world where the horse and the coach can not be displaced by steam or electricity.

The hotel system of the Park will eventually include buildings at Mammoth Hot Springs, Norris Geyser Basin, the Lower Geyser Basin, the Upper Geyser Basin, the West Shore of the Yellowstone Lake, the Lake Outlet, the Grand Cañon, and Tower Falls; with probably additional ones on the eastern and southern approaches. Five of these buildings are already in existence. They include all essential modern appurtenances of a first-class hotel, and will, of course, be improved and developed with the increase of travel.

There is an hotel system in vogue in the Park, which has served satisfactorily for several years a large section of the traveling public, and has gained wide popularity. It is the "permanent camp" system established by W. W. Wylie, and hitherto known by his name. It consists virtually of hotels under canvas, and its chief merit lies in the more economical service which it provides for the tourist.

In addition to these methods of sheltering and subsisting visitors, camping by individual parties is resorted to extensively.

Over the roads above described the tourist is carried from point to point in coaches. These are usually drawn by four horses, sometimes by six, and are supplemented by single conveyances for the accommodation of special parties. The present system is the result of long development and is as complete as any in the world. The average speed of travel is about six miles per hour, and the longest single drive between hotels is twenty miles.

The drivers are men of experience and skill, and serve the additional role of guide. They bear a relation to the visitor not unlike that of a boat captain to his passengers, and no small part of the tourist's pleasure is dependent upon them. Some of these drivers have grown up with the transportation business of the Park from the beginning, and have acquired an enviable celebrity in the lore of this region.

The course of the tourist route is such as to include the Yellowstone Lake for a distance of about twenty miles. A boat plies from the west shore, where it meets the coaches from the Upper Basin, to the hotel at the Lake Outlet. This voyage is one of the most delightful features of the Park tour.

Orange Geyser and Pulpit Terrace.

CHAPTER XI.

ADMINISTRATION OF THE PARK.

The administration of the Park is assigned by law to the Secretary of the Interior, who delegates his authority to a local Superintendent. By statute, also, the Secretary of the Interior is authorized to call upon the Secretary of War for such details of troops as may be necessary to protect the Park. Owing to the failure of Congress to provide for a civilian Superintendent and police force, since 1886, the Secretary of the Interior has found it necessary to avail himself of this second statute, so that the present working of the Park administration is on this wise:

An army officer, commanding the troops of the Park, is the representative of the Secretary of the Interior, and is called the Acting Superintendent of the Park, on the assumption that the old *regime* of civilian Superintendents is only temporarily suspended. The Superintendent is charged with the enforcement of the rules and regulations provided for the government of the Park. As to all such matters, he receives his instructions direct from the Secretary of the Interior, and he annually submits to that official a report upon the condition of the Park.

The specific duties which form the burden of the Superintendent's work are as follows:

(1) The supervision of all privileges granted to private parties by the Secretary of the Interior for the conduct of business upon the reservation.

(2) The protection of the Park from vandalism. The pardonable desire to carry off specimens of the beautiful

formations, and the morbid craze, peculiar to certain minds, to cover them with individual names, would, if unrestrained, soon destroy what nature, through long ages, has so laboriously built up.

(3) The protection of game. This has now become one of the most important duties of the Superintendent, because of the high place which the Park is destined to hold as a preserve for the native fauna of the continent.

(4) The preservation of the forests.

To assist him in his work of patrolling the reservation, the Superintendent relies primarily upon a force of cavalry troops. It is probable than an entire squadron will be required hereafter, and the necessary garrison buildings for a force of this size are being provided at Fort Yellowstone. A portion of this force will be constantly out in the Park, where commodious and comfortable quarters are provided for squads of about ten soldiers each. There are ten of these sub-stations in all, and they are occupied throughout the entire year. Nearly all of them are connected with Fort Yellowstone by telephone. The duties of these detachments are to protect the formations, forests and game, to assist visitors with information and guidance, and to report all irregularities that fall under their observation. The entire circuit of the roads is patrolled daily and a strict surveillance is maintained over all the interests of the Park.

The frequent changes of troops to meet the necessities of the service in other parts of the country prevent that close acquaintance with the Park which is essential to its thorough police. To offset as far as possible this unavoidable drawback, the Superintendent is allowed a small force of civilian scouts who remain on the work from year to

year. One of these scouts is paid from the appropriation for the army and the others from the regular appropriation for the Park. They are necessarily men of much resource, inured to hardship and fatigue, and possessed of tact and judgment to discharge properly the often delicate duties which are thrust upon them.

The Superintendent is allowed a civilian clerk to assist him in the work of his office at Mammoth Hot Springs.

Many reasons combine to make the position of Superintendent of the Yellowstone Park a very popular one among army officers, and it is probably more sought after than any other position outside of the regular line of their profession.

Besides the Superintendent, who is the executive officer of the Park, there is a judicial officer in the character of United States Commissioner. This office was created by the National Park Protective Act of 1894, which directed that the United States Circuit Court in the District of Wyoming should appoint a Commissioner to reside permanently in the Park. The same statute appropriated funds for the erection of a jail and courtroom at Mammoth Hot Springs. For the service of legal process the United States Marshal for the District of Wyoming is authorized to appoint one or more deputies to reside in the Park.

The Commissioner has jurisdiction to try all offenses against the Park statutes and regulations, and he is authorized to arrest and bind over to the proper court any person committing a felony within the Park. Offenses not prohibited by the Park statutes or regulations are subject to the same punishment as the laws of Wyoming provide in such cases. The courts of the three States, Wyoming,

Montana, and Idaho, are authorized to serve civil and criminal process in those parts of the Park that lie within their respective territories.

The administrative and judicial machinery of the Park is now admirably adapted to its purpose, and there is no sufficient reason why the protection of all its interests should not be thoroughly efficient.

CHAPTER XII.

A TOUR OF THE PARK.

Preliminary.

From what has been thus far set forth the reader can not have failed to observe how fortunate have been the events, in both prehistoric and recent times, which have made the Yellowstone Park what it is to-day. In the course of long ages Nature developed this region into its present attractive form and filled it with wonders which will always command the admiration of men. She placed it at the very apex of the continent, whence it sends forth in every direction perennial supplies of water to the thirsty desert around it. She overspread it with sheltering forests and grass-covered parks and valleys, where the native fauna, elsewhere fast passing away, may find a secure refuge in all future time. With infinite foresight she made it unfit for the gainful occupations of men, so that every motive to appropriate it for private use is removed. For many years after the white man first looked within its borders, a rare combination of circumstances prevailed to keep it from becoming generally known until the time had arrived when the government could effectually reserve it from settlement. Finally, since its formal erection into a public park, the same good fortune has attended it, in spite of many adverse influences, until it has become thoroughly intrenched in the good opinion of the people.

It is undoubtedly true that in dedicating this tract of country to "the benefit and enjoyment of the people," the

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founders of the Yellowstone Park were wiser than they knew. Very probably the word "benefit," as we may now interpret it, had little weight with them, and was put in as a fuller justification of what was then an unprecedented measure. Most likely they saw no benefit in the new Park except that which flows from all true enjoyment; and it was after all the pleasure that comes from beholding the wonders of nature that influenced their action.

In a large degree the same consideration prevails to-day. The people go to the Park to see its "wonders," and in their hurried visits this is about all they can attend to. Whatever interest they may feel in the history and physiography of this region, it is still the natural phenomena of which they have heard so much that receive their principal attention. It is therefore incumbent, in a work like the present, to consult the convenience of the visitor in this respect; and no better method suggests itself than to accompany him on a tour of the Park, explaining its features of interest as they fall under his observation.

In the following description there will be mentioned in succinct outline all the notable objects of interest in the Park. The necessary limit of space forbids anything like extended description, even if the inherent difficulties of such a task would permit. Captain Ludlow has well stated the nature of these difficulties:

"The Park scenery, as a whole," he says, "is too grand, its scope too immense, its details too varied and minute, to admit of adequate description, save by some great writer, who, with mind and pen equally trained, can seize upon the salient points, and, with just discrimination, throw into proper relief the varied features of mingled grandeur, wonder, and beauty."

Of the many who have attempted, with pen or pencil, to reproduce the wonders of the Yellowstone, no one has yet completely satisfied these important requirements. The writer, for his part, will modestly decline any such undertaking, and, like that pioneer explorer, Folsom, will confine his descriptions "to the bare facts." He will, however, occasionally call to aid those who have seen and written of these wonders. To the early explorers, in particular, who entered this region before it became generally known, its strange phenomena appealed with an imaginative force which the guide-book tourist of to-day can hardly realize. This may account for the fact that some of these explorers, who have never, before or since, put pen to paper with any literary purpose in view, have left in their narratives strokes of word painting which the most gifted writer would find it difficult to excel.

The best season for the tour is in the early days of July. The rain and snow and chilly air, not uncommon in June, are gone. The drought and smoke of August and September are still remote. Only mosquitos, so amazingly plentiful at certain seasons (Langford found them on the very summit of the Grand Teton), are a drawback worth considering. It is late enough, however, to call forth in their richest glory the magnificent profusion of flowers which everywhere abound in the Park. The air is at its best, full of life and energy, and clear—so clear that it confounds distances and gives to objects, though far away, a distinctness quite unknown in lower altitudes. The skies, as they appear at this season, surpass the sunny skies of Italy, and the tourist will find in their empyreal depths a beauty and fascination forever lacking in the dingy air of civilization. In short, the open air

coach rides through this rich mountain atmosphere form one of the most attractive and invigorating features of the tour.

The general course of the tour, as it will probably always be followed by the vast majority of visitors, is from Mammoth Hot Springs to Norris Geyser Basin, the Firehole Geyser Basins, the Yellowstone Lake, the Grand Cañon, Mt. Washburn and the country near Tower Falls.

CHAPTER XIII.

A TOUR OF THE PARK.

North Boundary to Mammoth Hot Springs.

Distance five miles. The road for most of the way lies in the valley of the Gardiner. The principal points of interest *en route* are:

Northern Entrance to the Park.—The Northern Pacific Railroad touches the Reservation at this point, where a well-designed and appropriate station has been erected. Just across the boundary the government has built a dignified and substantial gateway. The space between the station and gate, enclosed by a loop in the road leading to and from the platform, has been converted into a miniature park.

The Junction of the Gardiner and Yellowstone Rivers determines the north boundary of the Park.

The two prominent peaks which are in full view on the right as the tourist enters the Park are *Electric Peak* and *Sepulcher Mountain.* The feature which gave the latter its name is very apparent from this point.

Soon after crossing the boundary the road enters the *Gardiner Cañon,* which it follows for two miles. Portions of this valley are exceedingly picturesque. The cliffs on the east shore are bold and precipitous, but of a loose texture which suggests constant danger from falling rocks. The nests of ospreys here and there crown detached pinnacles. The chief beauty of the Cañon is in the stream itself, a typical, foaming, mountain torrent, of such rapid fall that, in its higher stages, it is a continuous mass of

snow-white foam. Dwarf cedar, cottonwood, willow, and the wild rose line its banks and give an added charm to its beauty. The tourist road crosses the river on steel bridges four times in the space of about a mile.

The Boiling River (3½ miles).—This feature, which can be seen from the hillside after the last crossing of the Gardiner, is an immense stream of hot water issuing from an opening in the rocks, and discharging directly into the river. It is formed of the collected waters of Mammoth Hot Springs, which find their way to this point through subterranean channels.

A winding road, which rises 600 feet in the distance of a mile and a half, carries the tourist from the valley of the Gardiner to the first of the great characteristic features of the Park, the world-renowned

Mammoth Hot Springs and to the administrative and business headquarters of the Park. This is the only point in the Park where an extensive transformation of natural conditions by the work of man has been permitted. Yet it was unavoidable here, and in yielding to this necessity, the effort has been made to provide a substitute that would be in harmony with the natural surroundings, and would be in itself a feature of interest. The grounds on which the various buildings stand have been carefully graded, provided with a thorough system of irrigation by which the old lime dust is converted into lawn, laid out with convenient roads and walks, and ornamented with shade trees and shrubbery. The entire group of buildings is provided with an ample water supply from a neighboring mountain stream, and both buildings and grounds are lighted with electricity from a plant located in rear of Capitol Hill, and operated by water from the same source as the domestic supply. The principal buildings are those

pertaining to the garrison of Fort Yellowstone, the office for the government work in the Park, the Weather Bureau Building, the Mammoth Hot Springs Hotel, and the office of the United States Commissioner.

First in importance, among the many natural features of interest accessible from this locality, are the *Hot Springs Terraces.* There have been built one upon another until the present active portion constitutes a hill rising 300 feet above the site of the Mammoth Hot Springs Hotel. The formation about these springs, it will be remembered, is calcareous, and to this fact is due its distinctive character, so different from the silica formations which prevail nearly everywhere else in the Park. The overhanging bowls which these deposits build up are among the finest specimens of Nature's work in the world, while the water which fills them is of that peculiar beauty to be found only in thermal springs. Speaking of this feature Dr. Hayden says:

"The wonderful transparency of the water surpasses any thing of the kind I have ever seen in any other portion of the world. The sky, with the smallest cloud that flits across it, is reflected in its clear depths, and the ultramarine colors, more vivid than the sea, are greatly heightened by constant, gentle vibrations. One can look down into the clear depths and see, with perfect distinctness, the minutest ornament on the inner sides of the basins; and the exquisite beauty of the coloring and the variety of forms baffle any attempt to portray them either with pen or pencil."

Cleopatra Spring, Jupiter Terrace, Pulpit Terrace, the *Narrow Gauge Terrace*—an incongruous name for a long fissure spring—the *White Elephant,* another fissure spring, and the *Orange Geyser,* a very pretty formation,

dome-shaped, with a pulsating spring in the top, are among the most interesting of the active springs.

Liberty Cap is the cone of an extinct spring and stands thirty-eight feet high. Its base is elliptical-shaped, and the long and short diameters are 24 and 18 feet, respectively.

Bath Lake is a warm pool of considerable size, much used for bathing.

Scattered over the formation in every direction are caves, springs, steam-vents, peculiar deposits, and curiosities without number to attract and detain the visitor. Many of them, like *Cupid's Cave,* the *Devil's Kitchen,* and McCartney's Cave, are of much interest. In the last-mentioned cave, or, more properly, crater, an elk fell one winter when the crater was level full with light snow. His antlers caught between the sides of the crater, holding him in a suspended position until he perished. He was found the following spring by Mr. McCartney. In many of the caves there is an accumulation of carbonic acid gas in sufficient quantities to destroy animal life. The chief sufferers are the birds, which are killed by it in great numbers. The *Stygian Cave* at the extreme upper end of the active terraces is the most noted in this respect.

Besides the "formation," as the terraces are collectively termed, there are many other features of interest within an easy ride or drive.

Lookout (or *Capitol*) *Hill* is a prominent rounded elevation opposite the hotel. Upon its summit is a block-house, built by Colonel Norris, in 1879, as a headquarters building for the Superintendent. The awkward and inconvenient location was selected for its defensive qualities. It will be remembered that the two previous years, 1877 and 1878, had witnessed the Nez Percé and Bannock incursions into the Park.

Around *Bunsen Peak* (12 miles). This is one of the most picturesque and beautiful drives in the Park. Leaving Mammoth Hot Springs the road leads first to the Glen Creek crossing, directly at the foot of Bunsen Peak, and then climbs the mountain side by a rather steep grade, with many windings that develop the scenery to advantage. Some of the views from this grade are particularly fine. After reaching the top of the hill a short drive brings the visitor to the

Middle Gardiner Cañon and *Osprey Falls.* This cañon ranks next to the Grand Cañon of the Yellowstone as the most impressive in the Park, and Osprey Falls is one of the largest cataracts. The cañon walls (the Sheep-eater Cliffs of Norris)* just below the falls are at least 500 feet high, and palisades of columnar basalt, extending along both sides, form a striking feature. The high bench at the brink of the cañon near the falls is covered with a beautiful evergreen forest open enough to permit the growth of grass, and forms a delightful resort for pleasure parties.

From the falls the road extends like a rural lane through groves of evergreen and quaking aspen to the country south of Bunsen Peak, affording another fine view of the Gardiner Cañon, and opening out at length upon one of the genuinely beautiful mountain scenes of the Park. This is the *Gallatin Range,* as seen across the open country of *Swan Lake Flat.* The range is one of great prominence, and its higher peaks glisten with the snow that accumulates on their northern slopes in great depths every winter. Among the more noticeable peaks are *Mt. Holmes,* the *Quadrant, Three Rivers, Trilobite* and *Huntley.* Farther to the north *Electric Peak* stands out in perfect outline, the highest mountain in the Park, and one

* See page 133.

which the visitor will see from at least three other points in his tour. *Sepulcher Mountain,* with its broad grassy southern slope, seems very near; and *Terrace Mountain* closes in the gap between Sepulcher and Bunsen. The latter mountain stands out almost entirely alone, very regular in outline, and an easy mountain climb for one of its altitude.

Rounding the northern base of Bunsen Peak the road comes into the main tourist route just at the head of *Golden Gate Cañon,* through which Glen Creek finds its way between Terrace Mountain and Bunsen Peak. This cañon has always been considered one of the star features of the Park scenery. The view from either end locking through it is fine, and the local effects have been heightened by the construction of the government road in the side of the cliff on the left bank of the stream. Among its more prominent features are *Rustic Falls,* at the head of the cañon, and the concrete *Viaduct* at the lower end, the only structure of its kind in the world.

Descending the long hill on the return to Mammoth Hot Springs, the road leads through a very singular formation of *Travertine Rocks,* absurdly labeled in local nomenclature, the "Hoodoos." These rocks are a limestone formation of very weak texture and are scattered around in enormous boulders, some of them a hundred feet through, and all lying in the most indiscriminate confusion. The lines of stratification show how these rocks have been tipped from their original horizontal position, but the disturbing cause has affected no two alike. It would seem that the original crust of which they were a part became undermined, and that their present chaotic condition is the result of its breaking up and caving in.

Another interesting drive from Mammoth Hot Springs

is that through the *East Gardiner Cañon* to the very pretty cascade, *Undine Falls,* at its head. Here, too, the road, winding along the mountain in difficult and dangerous situations, is an important aid in developing the scenery.

It is through this cañon that access can most easily be had to the summit of *Mt. Everts,* whose bold escarpments rise in impressive grandeur directly across the valley from the road. The many vantage points along the crest of these cliffs afford some of the finest panoramic views in the Park.

CHAPTER XIV.

A TOUR OF THE PARK.

Mammoth Hot Springs to Norris Geyser Basin.

Distance, twenty miles. The first object of interest besides those already described after ascending the long hill above the Springs (four miles), is

Swan Lake (5 miles), a little pond on the right of the road.

The large ditch that parallels the road after crossing the outlet of the lake conveys water from the Gardiner River for the supply at Mammoth Hot Springs.

Willow Park (8 miles) comprises the valley of the lower course of Obsidian Creek. It is a dense growth of willows, and forms an attractive sight, either in the fresh foliage of spring or in its autumnal coloring.

Apollinaris Spring (10 miles) is on the left of the roadway, in a pine forest. Tourists generally stop and try its water.

Obsidian Cliff (12 miles) is composed of a kind of volcanic glass, black as anthracite, which abounds at this point in enormous masses. The Indians once quarried implements of war and the chase here, and many fine arrowheads have been picked up by explorers. The building of the first road along the base of this cliff has some historic celebrity, owing to the novel method adopted in clearing away the rock. Colonel Norris, the builder, broke the glassy material into fragments by heating it with fires and then dashing cold water upon it.

Beaver Lake (12.5 miles) has its outlet opposite the

base of Obsidian Cliff. It is formed by ancient beaver dams, now overgrown with vegetation. The old dam extends in a sinuous line entirely across the valley, and, although apparently less than a yard thick, is quite impervious to water. The lake is a great resort for water fowl later in the year.

Roaring Mountain (15.5 miles) is a high hill on the left of the road, with a powerful steam vent near the summit. For many years prior to 1902 the sound which gave rise to the name had almost disappeared. But in that year there was a wonderful development of thermal activity and the sound increased to such an extent that it could be heard at the distance of a mile. The increased heat killed the trees on the mountain side over the space of half a mile square.

Twin Lakes (16 miles) are two exquisitely beautiful ponds, if only seen in a good sunlight and with a tranquil surface. The peculiar green of the water is perhaps to be seen nowhere except in the National Park. It resembles the coloring of the water in such quiescent springs as the Morning Glory, but it is not here due to hot water; for ice forms on these lakes in cold weather as quickly as upon any other waters of the Park.

The *Frying Pan* (17.75 miles) is a small basin of geyserite, on the right of the road, vigorously stewing away in a manner which reminds one of a kitchen spider in operation.

After passing Obsidian Cliff evidences of hot spring action constantly increase, until they reach their climax in the *Norris Geyser Basin.* There are but few other places in the Park where the odor of sulphur is so general and offensive as on this portion of the tourist route.

Norris Geyser Basin is clearly among the more recent

volcanic developments of this region. Its rapid encroachment upon the forest growth, and the frequent appearance of new springs and the disappearance of others, indicate its relatively recent origin. Compared with the Firehole Geyser Basins it is of minor importance, so far as the magnitude of its phenomena are concerned; but coming first to the notice of the tourist it receives a large amount of attention. Its activity is evidently on the increase, but it shows less stability than the older geyser basins, and its principal features are undergoing constant change. For example, its only prominent geyser, the *Monarch*, became inactive in 1902, but whether permanently so is wholly uncertain. The wonderful steam vents known as the *Growler* and *Hurricane* have yielded their strength to a new vent, which holds the record for power over them both and rivals the one which has given Roaring Mountain its name. The mist that comes from these steam vents has killed the trees for a long distance around, and keeps the road constantly muddy in their vicinity.

The *Constant* and *Minute-Man*, small geysers, make up in frequency of action what they lack in power.

The road passes through the midst of this basin, in close proximity to some of the boiling springs, and does not get clear of the hot ground until it enters *Elk Park*, a mile and a half beyond Norris. There is a great profusion of names for these various features—such as *Congress, Arsenic, Pearl, New Crater, Emerald Pool, Locomotive,* etc., but their location and identity can be determined satisfactorily only by the aid of the sign-boards or a guide.

From the Norris Hotel a drive of three miles up the Gibbon River, on the cross road leading to the Grand Cañon, carries the tourist to *Virginia Cascade*, a pictur-

esque waterfall in a rocky cañon of considerable beauty. This cascade is not a cataract, but a rocky slide on which the water glides down some sixty feet over the slippery surface of the rock. In fact, this characteristic prevails on the Gibbon River as far down as the head of the cañon, four miles below Norris, and the river slips over a smooth rocky floor a considerable part of the distance.

Near the Virginia Cascade is quite a noted feature on the old road called the *Devil's Elbow,* an extremely sharp turn of nearly 180 degrees around a jutting point of rock. It was a constant menace to travel. In 1902 this old road was replaced by a new one cut in the rock of the cliff above, where it now forms one of the attractions between Norris and the Cañon.

Another feature on this road which may properly be noted here, is the *Wedded Trees,* as they have been named. They are near the sixth mile-post from Norris. Two tall slender pines are permanently united by a limb growing between them. This singular phenomena has been met with in several other places in the Park.

Near the eighth mile post, where an old freight road branches off to the Cañon Hotel, is the site of the famous "hold-up" of 1897. At this point a few masked highwaymen stopped all the regular coaches of the day, including a government conveyance with an army officer and his family. No bodily injury was done anyone, but the pockets of the entire party were successfully emptied of all valuables. The exploit was a very clever piece of work. and its authors made good their escape.

CHAPTER XV.

A TOUR OF THE PARK.

Norris Geyser Basin to Lower Geyser Basin.

Distance, 20 miles. The road follows the Gibbon River to within four miles of its mouth, then crosses a point of land to the Firehole, and ascends the right bank of the latter stream to the Lower Basin.

Gibbon Meadows (3.5 miles) is a broad open bottom, just at the head of Gibbon Cañon.

The *Gibbon Paint Pots* (4 miles) are on the left of the road, near the head of the cañon, and one-fourth of a mile away.

Monument Geyser Basin (4.5 miles), is on the high hill just west of the upper end of Gibbon Cañon. It is an interesting spot, but rarely visited owing to its inaccessibility. It was discovered and named by Colonel Norris.

The *Gibbon Cañon* (4 to 10.5 miles) affords the tourist one of the pleasantest rides in the Park. The mountains rise boldly from the river on either side, and present several particularly fine views. The road lies close to the river's edge, and the stream is an important adjunct to the scenery.

Beryl Spring (5 miles) is close to the road on the side opposite the river. It boils violently and discharges a large amount of water. The steam from it frequently obscures the roadway.

The *Soda and Iron Spring* (8 miles), like Apollinaris Spring already mentioned, is a frequent stopping place for tourists.

Gibbon Falls (8.5 miles) is a waterfall of very irregular outline, but withal one of much beauty. The road hangs on the side of the cliff far above it, and affords a lovely view of the forest-covered valley below.

The *Western Approach* (10 miles). At a point where the main road leaves the valley of the Gibbon River to cross over to the Firehole River, the Gibbon Branch of the Western Approach comes in. There are no features of particular interest on this road beyond the general beauty of the scenery, except an "apollinaris" spring just below the Gibbon Bridge, and a very large boiling spring about a mile above the junction of Gibbon and Firehole Rivers.

Returning to the main route, a drive of five miles from the Gibbon River, brings the traveler to the *Firehole River* (14.5 miles) at the site of a very pretty cascade. At this point the Firehole Branch of the Western Approach comes in. The road ascends the right or east bank of the river for the next three miles. There are several attractive river scenes on this stretch of road.

Nez Percé Creek (18 miles) is the principal tributary of the Firehole, and is of historic interest from the fact that the route of Chief Joseph in 1877 was along its valley. Howard's first camp in the Park, Camp Cowan, was situated about half a mile above the modern bridge, while five or six miles farther on are the sites of the council and the attack described in an earlier chapter.

This stream forms the north boundary of the *Lower Geyser Basin,* and a drive of two miles after crossing the bridge lands the tourist at the *Fountain Hotel,* near a well-known geyser of the same name.

To attempt anything like a detailed description of the Firehole Geyser regions would be intolerable alike to reader and author. Of the objects of interest, any one of

which in other localities would attract marked attention, there are several thousand. In the present description, therefore, only the more important features will be noticed—those notable objects to see which is an indispensable part of any well-ordered tour of the Park.

The *Fountain Geyser* is a typical example of the first class of geysers described in a previous chapter. Its proximity to the hotel (one-fourth mile) causes it to be much visited.

The *Mammoth Paint Pots,* a little way east of the Fountain, are probably the most prominent example of this class of phenomena in the Park.

The *Great Fountain Geyser* lies a mile and a half southeast of the Fountain. It is the chief wonder of the Lower Basin, and, in some respects, the most remarkable geyser in the Park. Its formation is quite unlike that of any other. At first sight the visitor is tempted to believe that some one has here placed a vast pedestal upon which to erect a monument. It is a broad, circular table about two feet high, composed entirely of hard silicious deposit. In its surface are numerous pools molded and ornamented in a manner quite unapproachable, at least on so large a scale, in any other part of the Park. In the center of the pedestal, where the monument ought to stand, is a large irregular pool of great depth, full of hot water, forming, to all appearances, a lovely quiescent spring. At times of eruption, the contents of this spring are hurled bodily upward to a height sometimes reaching 100 feet. The torrent of water which follows the prodigious down-pouring upon the face of the pedestal, flows away in all directions over the white geyserite plain. No visitor to the Yellowstone can afford to miss the Great Fountain Geyser.

Surprise Pool, close to the Great Fountain, is always

ready to disclose the reason for its name to any one who will go to the trouble of throwing into it a handful of dirt or a spray of evergreen.

The *Eggshell,* on the left bank of a hot stream that flows a little south of the Great Fountain, is shaped like an egg set on end in the ground with the upper third of the shell broken off. It is an exquisite trifle.

In a small valley, extending to the northeast from the Great Fountain, are several objects worthy of notice. One of these is an immense hot lake, by far the largest in the Park. *Steady Geyser* and *Young Hopeful,* near the head of the valley, are not remarkable in this land of geysers.

The principal attraction of the locality is what has come to be called the *Firehole.* It is at the extreme upper end of the valley, difficult to find, and unsatisfactory to visit when the wind agitates the water surface. It is a large hot spring from the bottom of which, to all appearances, a light colored flame is constantly issuing, only to be extinguished in the water before it reaches the surface. At times it has a distinct ruddy tinge, and it always flickers back and forth like the lambent flame of a torch. When seen under favorable conditions, the illusion is perfect, and the beholder is sure that he has at last caught a glimpse of the hidden fires which produce the weird phenemena of this region. But it is only illusion. Through a fissure in the rock superheated steam escapes and divides the water just as bubbles do on a smaller scale. The reflection from the surface thus formed accounts for the appearance, which is intensified by the black background formed by the sides and bottom of the pool.

About half a mile southwest of the Fountain Geyser, as elsewhere described, in an open grove on the banks of

a little stream, is the spot where the Nez Percé Indians captured the Cowan party, August 24, 1877.

The Lower Geyser Basin has an area of thirty square miles. Conspicuous among its topographical features are the *Twin Buttes,* two prominent peaks west of the river, which dominate the entire basin.

There will be included in this chapter, as more properly belonging to it than to the next, a description of the *Midway Geyser Basin.* Its principal interest lies in the stupendous character of its phenomena.

Excelsior Geyser, as a dynamic agent, has no equal in the Park. It is really a water volcano, and its eruptions have nothing of the characteristic display of a genuine geyser. Its crater is a vast seething caldron close by the brink of the Firehole River, into which, in non-eruptive periods even, it pours 4,000 gallons of water per minute. The shape of the crater is irregular. Its dimensions are about 330 by 200 feet, and 20 feet deep. It was not known to be a geyser until 1878, and did not really disclose its true character until the winter of 1881. During the remainder of that year and 1882, it gave continuous exhibitions of its power. Its water column was more than 50 feet in diameter, and occasionally rose to the enormous height of 250 feet. At such times it doubled the volume of water in the Firehole River. Its eruptions were frequently accompanied by the ejection of large rocks. A second period of activity took place in 1888, since which time it has remained inactive.

Prismatic Lake is the most perfect spring of its kind in the world. It rests on the summit of a self-built mound, sloping very gently in all directions. Down this slope the overflow from the spring descends in tiny rivulets, everywhere interlaced with each other. A map of the mound

Crater of Great Fountain Geyser.

resembles a spider web, with the spider (the spring) in the center. The pool is 250 by 300 feet in size. Over the lake hangs an ever-present cloud of steam, which itself often bears a crimson tinge, reflected from the waters below. The steam unfortunately obscures the surface of the lake, and one involuntarily wishes for a row-boat, in which to explore its unseen portions. Wherever visible, there is a varied and wonderful play of colors, which fully justifies the name.

Turquoise Spring is another large pool, 100 feet in diameter, and rivals Prismatic Lake in the beauty of its coloring.

The *Midway Geyser Basin* contains hundreds of other springs, some of them very beautiful, but the Basin is mainly noted for the three features just described.

CHAPTER XVI.

A TOUR OF THE PARK.

Lower Geyser Basin to Upper Geyser Basin.

Distance, nine miles. Road follows the Firehole River. Midway Geyser Basin, already described, is passed four miles out. No other object of interest is met until the visitor actually arrives at the Upper Basin.

This locality is probably the most popular with the tourist of any in the Park. Its two rivals, the Grand Cañon and the Yellowstone Lake, are so unlike it as not to admit of any comparison. It is the home of the genus geyser, as seen in its highest development. There are fifteen examples of the first magnitude and scores of less important ones.* The quiescent pools and springs are also numerous and of great beauty.

The first important feature *en route* is the *Biscuit Basin,* which is reached by a side road leading to the west bank of the Firehole River. It contains a geyser and several beautiful springs. The most interesting are the *Jewell Geyser* and the *Sapphire Pool.* Near this locality is the *Mystic Falls,* a fine cascade, on the Little Firehole River.

Artemisia Geyser comes next to the attention of the tourist. It has been known as a geyser only since 1886. It is on the right of the roadway, at a considerably lower level.

The *Morning Glory* is a little further up stream. In

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* For list of names of geysers, with heights of eruptions, see Page 343.

this beautiful object the quiescent pool is at its best. Its exquisite bordering and the deep cerulean hue of its transparent waters make it, and others like it, objects of ceaseless admiration.

The *Fan Geyser* is close by the Firehole on the east bank, not far above the Morning Glory. The *Riverside* is also on the east bank at the point where the road crosses the river. It is an inconspicuous object when not in eruption, and one would scarcely suspect it of being a geyser. It spouts obliquely across the river, and not, like most geysers, vertically.

Next in order, after crossing the river to the west bank, is the *Grotto,* remarkable for its irregular and cavernous crater. A little further on, close to the river, stands the broken crater of one of the Park's greatest geysers, the *Giant.* Lieutenant Doane compared its crater to a "huge shattered horn."

A few hundred feet further up stream, still close to the river, is the *Oblong.* Directly across the road, but a short distance away, is the *Splendid,* well worthy of its name; and near it, sometimes playing simultaneously, is the *Comet.*

To the westward from the Firehole, nearly on the divide between it and Iron Creek, is a lovely spring, called the *Punch-Bowl.* Across the divide in the Iron Creek Valley is the *Black Sand Basin,* a unique but beautiful pool. Near it is another attraction, *Specimen Lake,* so named from an abundance of specimens of partly petrified wood. The limit of curiosities in this direction is *Emerald Pool,* which competent judges pronounce to be the finest quiescent spring in the Park.

Returning to the Firehole by a different route, we pass a large spring or geyser known as the *Three Crater Spring.*

Its three craters are connected by narrow water ways, making one continuous pool, though fed from three sources.

A thousand feet to the north stands the most imposing crater in the Park, that of the *Castle Geyser.* It is frequently seen in moderate eruption, but rarely when doing its best. As ordinarily seen, it throws a column of water only 50 or 60 feet, but at times it plays as high as 150 or 200 feet.

Crossing the river to its right bank, nearly opposite the Castle, there are found within a narrow compass three noted geysers, the *Sawmill, Turban,* and *Grand.* Of these the last is by far the finest and ranks among the very greatest geysers in the world. It was not seen by the Washburn Party, in 1870, but it seems to have been the first geyser to welcome to the Upper Basin the Hayden and Barlow parties in 1871. Captain Barlow says of its eruption: *

"This grand fountain continued to play for several minutes. When dying down, I approached to obtain a closer view of the aperture whence had issued such a powerful stream. A sudden gush of steam drove me away, following which the water was again impelled upward and upward, far above the steam, till it seemed to have lost the controlling force of gravity, and that it would never cease to rise. The roar was like the sound of a tornado, but there was no apparent effort; a steady stream, very graceful and perfectly vertical, except as a slight breeze may have waved it to and fro. Strong and smooth, it continued to ascend like the stream from a powerful steam fire-engine. We were all lost in astonishment at the sudden and marvelous spectacle. The proportions of the fountain were perfect. The enthusiasm of the party was manifested

* Page 25, "Reconnaissance of the Yellowstone River."

in shouts of delight. Under the excitement of the moment, it was estimated to be from three to five hundred feet in height."

Further up the river on the same side and at some distance back, are the *Lion, Lioness* and the two *Cubs,* an interesting group, including one notable geyser. Half way up a high mound of geyserite which covers a large area on the north side of the river, is an exquisitely beautiful formation called, from its appearance, the *Sponge.*

On top of the mound is another of the great geysers, thought by the Washburn Party to be the greatest in the world, the *Giantess.* It belongs to the class of fountain geysers, and when not in action strongly resembles a quiescent spring. Its eruptions are infrequent and irregular, but when it does play it is a sight not to be forgotten. Mr. Langford thus describes the first eruption known to have been seen by white men:*

"We were standing on the side of the geyser nearest the sun, the gleams of which filled the sparkling columns of water and spray with myriad rainbows, whose arches are constantly changing— dipping and fluttering hither and thither, and disappearing only to be succeeded by others, again and again, amid the aqueous column, while the minute globules, into which the spent jets were diffused when falling, sparkled like a shower of diamonds, and around every shadow which the denser clouds of vapor, interrupting the sun's rays, cast upon the column, could be seen a luminous circle, radiant with all the colors of the prism, and resembling the halo of glory represented in paintings as encircling the head of Divinity. All that we had previously witnessed seemed tame in comparison with the perfect grandeur and beauty of this display."

* "The Wonders of the Yellowstone."

Between the Giantess and the river is the *Bee Hive,* also one of the more prominent geysers. The symmetry of its cone is only surpassed by the regularity of its water column. From an artistic point of view it is the most perfect geyser in the Park. Its slender jet attains a great height and is vertical and symmetrical throughout.

Crossing again to the west bank of the stream and ascending to the very head of the basin, we come to the last and most important of the geysers, *Old Faithful.* Any other geyser, any five other geysers, could be erased from the list better than part with Old Faithful. The Giant, Giantess, Grand, Splendid, and Excelsior, have more powerful eruptions. The Bee Hive is more artistic. The Great Fountain has a more wonderful formation. But Old Faithful partakes in a high degree of all these characteristics, and, in addition, has the invaluable quality of uniform periodicity of action. It is, in fact, the most perfect of all known geysers.

To it fell the honor of welcoming civilized man to this region. It was the first geyser named. It stands at the head of the basin and has been happily called "The Guardian of the Valley."

It is located in the center of an oblong mound, 145 by 215 feet at the base, 20 by 54 feet at the summit, and about 12 feet high. The tube, which seems to have originated in a fissure in the rock, has an inside measurement of 2 by 6 feet.

The ornamentation about the crater, though limited in extent, is nowhere surpassed for beauty of form and color. In particular, the three small pools on the north side of the crater, and very close to it, are specimens of the most remarkable handiwork which Nature has lavished upon this region. A singular fact is that the

waters in these three pools, although so close together as apparently to be subject to the same conditions, are of different colors. Speaking of these marvelous appearances, Lieutenant Doane says:*

"One instinctively touches the hot ledges with his hands, and sounds with a stick the depths of the cavities in the slope, in utter doubt of the evidence of his own eyes. . . . It is the most lovely inanimate object in existence."

In its eruption this geyser is equally fascinating. It always gives ample warning, and visitors have time to station themselves where the view will be most perfect. The graceful column rises, at first with apparent effort, but later with evident ease, to a height of 150 feet. The noise is simply that of a jet of water from an ordinary hose, only in intensity corresponding to the greater flow. The steam, when carried laterally by a gentle breeze, unfurls itself like an enormous flag from its watery standard. The water is of crystal clearness, and the myriad drops float in the air with all manner of brilliant effects. To quote Lieutenant Doane again:

"Rainbows play around the tremendous fountain, the waters of which fall about the basin in showers of brilliants, and then rush steaming down the slopes to the river."

The uniform periodicity of this geyser is its most wonderful and most useful characteristic. It never fails the tourist. With an average interval of sixty-five minutes, it varies but little either way. The combination of conditions by which the supply of heat and water, and the form of tube, are so perfectly adapted to their work, that even a chronometer is scarcely more regular in its action,

* Page 29, "Yellowstone Expedition of 1870."

is one of the miracles of nature. Night and day, winter and summer, seen or unseen, this "tremendous fountain" has been playing for untold ages. Only in thousands of years can its lifetime be reckoned; for the visible work it has wrought, and its present infinitely slow rate of progress, fairly appall the inquirer who seeks to learn its real age.

UPPER GEYSER BASIN.

CHAPTER XVII.

A TOUR OF THE PARK.

Upper Geyser Basin to the Yellowstone Lake.

Distance nineteen miles. The route ascends the Firehole River to the mouth of Spring Creek, which stream it follows to the Continental Divide. For seven miles it then lies on the Pacific slope, after which it descends the mountains to the Yellowstone Lake. The drive is one of the most pleasant in the Park, and the scenery is picturesque and wild.

Kepler Cascade (1.25 miles) is a fascinating waterfall. Lieutenant Doane, who first wrote of it, says:*

"These pretty little falls, if located on an eastern stream, would be celebrated in history and song; here, amid objects so grand as to strain conception and stagger belief, they were passed without a halt."

Half a mile up the Firehole, above the mouth of Spring Creek, is the *Lone Star Geyser* (4 miles). This geyser is conspicuous chiefly for its fine cone. It plays frequently to a height of 40 or 50 feet.

Madison Lake, ten miles further up the valley, is the ultimate source of the Madison River. This body of water, with the exception of Red Rock Lake, the source of the Jefferson, is further from the sea by direct water course than any other lake on the globe.

Returning down the Firehole, we enter the mouth of *Spring Creek Cañon* (3.5 miles), which the road ascends for a distance of three miles. This is one of the prettiest

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* Page 27, "Yellowstone Expedition of 1870."

drives in the Park. The cañon is narrow and winding, hemmed in by fantastic rocks and dark, evergreen forests, and traversed by a crystal mountain stream whose banks are thickly lined with willow and other shrubbery.

The first crossing the Continental Divide (8.5 miles) is through a narrow, rocky gorge, overhung by precipitous cliffs, inclosing a lily covered pond which rests squarely on the doubtful ground between the two oceans. *Craig Pass* and *Isa Lake* are the names that have been used to designate these two features.

Corkscrew Hill (9 miles) is a name originating with the stage drivers, and refers to a very winding stretch of side hill road about a mile long, leading down from the Divide to the valley of DeLacy Creek. Besides its picturesque scenery, its chief interest to the tourist lies in the exhilarating speed at which coaches are bowled down the hill after the slow and tedious pull up the other side.

Shoshone Point (10.5 miles) is in the center of the large amphitheater-shaped tract which is drained by the branches of DeLacy Creek. It overlooks Shoshone Lake and the broad basin surrounding it, and gives a splendid view of the Teton Mountains.

Shoshone Lake is a lovely body of water, with an area of twelve square miles and a most picturesque shore line. On its west shore is a geyser basin, second in importance only to those on the Firehole. Among its many interesting features may be mentioned the *Union Geyser,* of which the middle crater plays to a height of 100 feet; and the *Bronze Geyser,* very striking because of the perfect metallic luster of its formation.

From Shoshone Point, the road again ascends to the Continental Divide, and then drops down the Atlantic slope towards the Yellowstone Valley.

Lake View (18 miles) is at a point where a sudden turn in the forest road brings the tourist, quite without warning, in full view of one of the most striking water landscapes in the world. The whole vista of the Yellowstone Lake is spread out before him, still 300 feet below where he is standing. Far to the right and left, along the distant eastern shore, extends the Absaroka Range of mountains, many of its summits still capped with snow. Everywhere the dark pine forests come down to the water's edge, in fine contrast with the silver surface of the lake. The sparkling of the waves, the passage of the cloud shadows, and the tranquil mirror of the waters where sheltered from the wind, all combine to make the picture one to be long remembered.

The Yellowstone Lake is about 7,741 feet, nearly a mile and a half, above the level of the sea. It has a shore line of 100 miles, and an area of 139 square miles. Its maximum depth is 300 feet, and its average depth about 30 feet. It is fed almost entirely from the springs and snow drifts of the Absaroka Range. Its waters are icy cold, clear and transparent to great depths, and literally swarm with trout. It is subject to heavy southwest winds, and at times is lashed into tempestuous seas.

The shape of the lake was compared by the early explorers to the form of the human hand. The resemblance is exceedingly remote, and one writer has well observed that only the hand of a base ball player who has stood for years behind the bat could satisfy the comparison. The "fingers" have now been generally dropped from the maps and replaced by the usual names; but "Thumb" seems to have become a fixture.

Surpassing the Yellowstone both in area and altitude there are but few lakes in the world. Lake Titticaca, in

Peru, and one or two others in the less explored regions of the Andes, and also a few lakes on the lofty tableland of Thibet, comprise the number.

The Yellowstone Lake has been a theme of enthusiastic praise by all who have ever seen it, and no encomium that it would be possible to pronounce would overrate its merits. One has but to witness a summer sunrise or sunset in these magnificent surroundings to understand this. It is said that Lake Maggiore of Italy bears the closest resemblance to it of any well-known lake, but even it does not appeal to the imagination like these mountains and forests and resplendent waters; resting here in perfect harmony on the very summit of the continent. Standing on its shore in the long hours of a summer twilight, and looking out upon the tinted waters in which are imaged the sun-gilded mountain tops and the crimson halo of a western sky, one can well understand the thrill of inspiration behind these exquisite words of Mr. Folsom—his parting address to the lake in 1869, as he turned from its western shore into the deep forests that surround it:*

"As we were about departing on our homeward journey, we ascended the summit of a neighboring hill to get a final view of Yellowstone Lake. Nestled among the forest-crowned hills which bounded our vision, lay this inland sea, its crystal waves dancing and sparkling in the sunlight as if laughing with joy for their wild freedom. It is a scene of transcendent beauty which has been viewed by but few white men, and we felt glad to have looked upon it before its primeval solitude should be broken by the crowds of pleasure seekers which at no distant day will throng its shores."

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* Page 20, Langford's reprint of the "Valley of the Upper Yellowstone."

GIANT GEYSER CONE.

The storms on the lake are sometimes severe, and the northwest winds stir up a heavy sea nearly every day during the summer season. There is, however, nothing of a cyclonic character about them. A thunder shower on the lake in 1885 proved fatal to a member of a government surveying party who were out in a boat near the northeast corner of the lake. It was a combination sail and row boat, and the lightning struck the mast, instantly killing an oarsman who was sitting near it. The circumstances attending this unfortunate accident were very peculiar, and a deal of romantic lore has grown up around it. One singular feature was the fact that there was apparently no rain, and only a single clap of thunder—a veritable bolt from a clear sky. The party was under Mr. John R. Renshaw, United States Geological Survey, who was himself rendered insensible for a time by the shock.

A most singular and interesting acoustic phenomenon of this region, although rarely noticed by tourists, is the occurrence of strange and indefinable overhead sounds. They have long been noted by explorers, but only in the vicinity of Shoshone and Yellowstone Lakes. They seem to occur in the morning, and to last only for a moment. They have an apparent motion through the air, the general direction noted by writers being from north to south. They resemble the ringing of telegraph wires or the humming of a swarm of bees, beginning softly in the distance, growing rapidly plainer until directly overhead, and then fading as rapidly in the opposite direction. Although this phenomenon has been made the subject of scientific study, no rational explanation of it has ever been advanced. Its weird character is in keeping with its strange surroundings. In other lands and times it would have been an object of

superstitious reverence or dread, and would have found a permanent place in the traditions of the people.

Dropping down from Lake View, where we left the tourist while making these few observations upon Yellowstone Lake, we next come to *Duck Lake* (18 miles), a snug little pond of genuine beauty, ensconced in the dense forest scarcely half a mile distant from the shore of the larger lake.

The road touches the Yellowstone Lake at its westernmost extremity, where the *Southern Approach* comes in. This road leads up from the famous *Jackson Hole* and *Lake,* and from the *Teton Mountains,* all of which lie well south of the Park. The distance to the outlet of Jackson Lake, immediately opposite the Grand Teton, is forty-five miles. From Jackson Hole there is a government road leading into the Wind River Valley and Central Wyoming, and another road leading across Teton Pass into Idaho.

From the time when it first became well known to the fur traders before 1830, the Valley of Jackson Hole has been considered one of the most beautiful mountain valleys in the world. A striking feature is its extremely flat topography in certain portions, surrounded as it is by some of the most rugged mountains on the continent. Its beauty is greatly enhanced by the presence of several lakes, which lie immediately at the base of the Teton range, and in whose placid surface these mountains stand reflected as from the most perfect mirror. The landscape thus formed has been the despair of painters of natural scenery since the valley became frequented by students of nature. Neither pen nor pencil, nor the modern perfection of the photographic art, can reproduce its marvelous beauty.

The Teton Mountains, which the tourist sees from different points on the park road system, here stand forth in their full grandeur in his immediate presence. It is

the most striking mountain range in the entire Rocky Mountain region. The French trappers gave the name *Les Trois Tetons* (Three Tetons), because from certain points of view three peaks stood out prominently above all the others. The altitude of the Grand Teton is 13,691 feet, being the highest in the Central Rocky Mountain region north of Colorado, unless it be Fremont Peak, in the Wind River Mountains, which is of almost exactly the same altitude. It is not alone its great altitude that has made the Grand Teton so famous in frontier history. The topography of the surrounding country is such that its summit is visible at a great distance in almost every direction, while its appearance from wherever seen is striking and unmistakable. From Union Pass, for example, sixty miles east, it looks like a slender spire of pure outline piercing the sky, in appearance so remarkable that the beholder is forced to question whether it can really pertain to any mountain. It was the great prominence of this peak, and its ease of identification from other mountains, that made it so useful to the early travelers. Far and wide it was the beacon of the trapper. Familiar with its different aspects as seen from different directions, he could tell his position at once when his eyes fell upon it.

To the visitor in the Park, whether he goes to Jackson Hole or not, this mountain becomes a familiar sight, and one that never fails to appeal to his sense of natural beauty. It is prominently visible from the following points on the road system: Shoshone Point, Yellowstone Lake, several points on the East Road, and on nearly the entire portion of the road leading up the southern slope of Mt. Washburn.*

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* The Grand Teton is one of the most difficult mountains to climb of which there is any knowledge. To the present

The only objects of particular interest on the southern approach in going from Yellowstone Lake to Jackson Hole, are *Lewis Lake,* the *Falls of Lewis River,* just below the lake, and *Moose Falls,* on Crawfish Creek.

From the west shore of Yellowstone Lake a visit can be advantageously made to *Heart Lake* and *Mount Sheridan.* This lake has been pronounced the prettiest in the Park. Near it, on the tributary Witch Creek, is a small but important geyser basin. The principal features are the *Deluge, Spike* and *Rustic Geysers,* and the *Fissure Group* of springs. The Rustic Geyser is remarkable in having about it a cordon of logs, evidently placed there by the Indians or white men many years ago. The logs are completely incrusted with the deposits of the springs.

Mt. Sheridan would rank with Mt. Washburn as a popular peak for mountain climbers were it only more accessible. No summit in the Park affords a finer prospect.

The junction of the main tourist route with the southern approach is an important point in the Park business. A lunch station is located here and also a patrol station for government troops. It is here that the tourist boat leaves the west shore and from this point there is a choice of routes to the lake hotel at the outlet, either across the lake by boat or by the road over the hills.

The only attractions on the road are a few fine views of the lake, and the *Natural Bridge* (11 miles) over a small stream that empties into the lake. This feature consists

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time (1903) it has been ascended by white men only twice; by Messrs. N. P. Langford and James Stevenson in 1872, and by Messrs. William Owen, Frank S. Spalding, John Shive, and Frank Peterson in 1898. These explorers found, on a point a little lower than the main summit, a rude shelter of granite slabs, evidently placed there by human hands, one can only conjecture how long ago.

THUNDERSTORM ON YELLOWSTONE LAKE.

of an arch about forty feet high and thirty feet span. As seen from below, it is of very symmetrical outline.

The boat ride across the lake is one of the delightful features of the tour. It is a welcome relief from the long coach rides and is in itself a rare experience, for nowhere else in the ordinary routes of travel over the globe is the tourist likely to ride on a body of water of similar extent located a mile and a half above the level of the sea. From near the center of the lake the view is surpassingly fine. To the south and southwest the long arms of the lake penetrate the dark forest-clad hills, which are but stepping stones to the lofty mountains behind them. Far beyond these may again be seen the familiar forms of the Tetons. All along the eastern shore stand the serried peaks of the Absaroka Range, the boundary which nature has so well established along the eastern border of the Park. A notable feature of this range is the profile of a human face formed by the superimposed contours of two mountain peaks, one some distance behind the other. The best effect is had from points between Stevenson Island and the Lake Hotel. The face is looking directly upward. A similar profile, noted by the early explorers from the summit of Mt. Washburn, and nearly in the same locality as this, although of course not the same feature, was called by them the "Giant's Face," or the "Old Man of the Mountain."

The Yellowstone Lake is an important center of thermal activity. On the west shore is an extensive and important hot springs basin. The principal features are the *Paint Pots,* not inferior to those near the Fountain Hotel; two of the largest and most beautiful quiescent springs in the Park; the *Lake Shore Geyser,* which plays frequently to a height of about 30 feet; an unnamed geyser of considerable power but of very infrequent action; and the cele-

brated *Fishing Cone* where unfortunate trout find catching and cooking painfully near together. On the northeast shore are *Steamboat Spring,* and other thermal phenomena worth visiting.

Some twenty miles above the head of the lake is the celebrated *Two-Ocean Pass,* long known to the early trappers. It is probably the most remarkable example of such a phenomenon in the world. Although the fact of its existence was asserted and stoutly maintained by Bridger for many years prior to the discovery of the Park region, it was generally disbelieved until Captain Jones crossed the pass in 1873. It has since been visited and described by Hayden in 1878, by Hague in 1884, and by Prof. Evermann of the United States Fish Commission in 1891. The following facts are taken from Prof. Evermann's report:

The pass is in a nearly level grassy park hemmed in by the surrounding hills, and is 8,150 feet above the level of the sea. Its extreme length is about one mile and its extreme breadth about three-fourths of a mile. From the north a stream issues from a cañon and divides, part flowing to Atlantic Creek and part to Pacific Creek. A similar stream, with a similar division, comes from the south. At extreme low water, these divisions may possibly disappear and all the water flow either one way or the other. But at ordinary and high stages the water flows both ways. These streams are by no means insignificant rivulets, but substantial water-courses capable of affording passage to fish of considerable size.

Here, then, we have the very interesting phenomenon of a single stream upon the summit of the continent dividing and flowing part one way and part the other, and forming a continuous water connection between the Atlantic and Pacific Oceans over a distance of nearly 6,000 miles.

The *Lake Hotel* is situated about a mile southwest of the outlet in an open grove back a few hundred feet from the shore. It is the the most important point in the Park business except Mammoth Hot Springs. The headquarters of the boat management is here, as are also a branch station of the Weather Bureau, a patrol station for the troops and one of the Wylie "permanent camps." Only a mile and a half distant is the junction with the

Eastern Approach. This road is throughout its length one of exceptional scenic attraction, and will always be of great interest to travelers. It crosses the Yellowstone River just below the lake outlet, and then follows the shore of the lake for about four miles. It touches *Indian Pond* (3 miles), a very pretty sheet of water near the lake, from the shore of which a splendid view can be had of the Teton Mountains and of Mt. Sheridan. The next attraction is *Turbid Lake* (5 miles), a circular shaped body of water, half a mile in diameter. The bottom of this lake is honeycombed with steam vents which stir up the mud and keep the water in a roily, turbid condition.

Further on is a fine example of "wedded trees," and another of the numerous "apollinaris" springs. Everywhere the trails of elk may be seen, spreading like a net work over the mountain side, for this is a great summer grazing ground for these animals.

The road, as it winds along the hillsides to secure easy grades and bring out the scenery, affords several magnificent views of the lake and of the mountains beyond.

Sylvan Lake, near the source of Clear Creek, is one of the beauties of the Park. It is not a large body of water, but its irregular shore line, its fringe of dark evergreen trees and the lofty mountains that overhang it, make up a picture which appeals to the artistic instincts of the visitor.

Sylvan Pass (22 miles) takes its name from the lake, for there is nothing of a sylvan character in the pass itself. On the contrary it presents a scene entirely unique among mountain passes. It is like a vast trough, the sides of which are composed of loose rock that has fallen down from the lofty cliffs above, and now rests on its natural slope, forming a treacherous foothold even for the wild animals of the mountains. The great natural obstacles in crossing it have always prevented it from being much used, either by wild game or the Indians, and it was not until after extensive exploration that the government engineers finally selected it for the line of the Eastern Approach across the Absaroka Divide. Two considerations at length prevailed over the enormous difficulties of the work—the fact that the pass was nearly 1,000 feet lower than any other available, and the unique and unusual character of the scenery.

At the very summit of the pass a rippling waterfall comes down from the cliffs on the south, and flows into a little pond of great clearness and depth. Owing to the loose texture of the rock-filled ravine, a large part of the water that enters this pond flows away by subterranean passages, and it is full to overflowing only during the spring high water. By the end of the tourist season it falls nearly ten feet.

The pass is flanked by lofty mountains—*Avalanche Peak* and *Mount Hoyt* on the north, and *Grizzly* and *Top Notch Peaks* on the south. They rise directly from the pass to heights of from 1,000 to 2,000 feet.

Descending from the pass by a steep grade, the road arrives, in about a mile, at a crystal fountain which is probably the largest cold water spring in the park. It gives egress to the waters which flow out of Sylvan Pass

through the loose rock. This spring is on the immediate borders of *Middle Creek* (23 miles), the left shore of which the road follows to its outlet. The valley of this stream presents some of the most rugged topography in the mountains, and the construction of the road through it was a work of great difficulty. Wild torrents are everywhere rushing down the mountain sides. Frequent labyrinths of fallen trees and rocks show where avalanches and landslides have swept everything before them. Wherever the forests open so as to give a view outside, the lofty crests of the neighboring mountains are seen, in far greater apparent altitude than when viewed from a distance in the open country.

Soon after crossing the east boundary (30 miles), the road arrives at *Shoshone River* (32 miles), which it crosses just above the mouth of Middle Creek. It follows the immediate shore of this stream all the rest of the way through the forest reserve. Along this portion of the road the scenery is grand and inspiring. The mountains are far more rugged and wild than in the Park, and average about 2,000 feet higher. Strange and fantastic forms, like the "Hoodoos" east of the Park, abound. The river itself is a beautiful stream, but wild and unmanagable in the season of floods. Its shores are lined with attractive verdure in the form of cottonwood, quaking aspen and willow.

The Eastern Approach gives access to the Park from the celebrated Big Horn Basin, of Wyoming, and connects with the Burlington Railroad system.

CHAPTER XVIII.

A TOUR OF THE PARK.

Yellowstone Lake to the Grand Cañon of the Yellowstone.

Distance seventeen miles. The road follows the Yellowstone River along the west bank all the way.

Just after the tourist leaves the Lake Hotel he will see on the right of the roadway a small monument. It was placed there, in 1893, by the United States Corps of Engineers to mark a position accurately determined from astronomical observations by the United States Coast and Geodetic Survey in 1892. It is of value as a point of reference in surveys and other similar work.*

Mud Volcano (7.5 miles) is a weird, uncanny object, but, nevertheless, a very fascinating feature, and one which the tourist should stop and examine. It is an immense funnel-shaped crater in the side of a considerable hill on the west bank of the river. The mud rises some distance above a large steam vent in the side of the crater next the hill, and chokes the vent until the steam has accumulated in sufficient force to lift the superincumbent mass. As the imprisoned steam bursts forth it hurls the mud with great violence against the opposite side of the crater, making a heavy thud which is audible for half a mile. These outbursts take place every few seconds.

A striking example of the strange commingling of dissimilar features in the hot springs districts is found in the

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* Latitude, 40° 33′ 16.1″ north.
Longitude, 110° 23′ 43.1″ west.
Magnetic variation about 19″ east.

Grotto, a spring of perfectly clear water, not far from the Mud Volcano. It is acted upon by the steam in a manner precisely similar to that of the Mud Volcano, but its waters issue directly from the rock, and are entirely clear.

Mud Geyser, now rarely seen in action, was an important geyser twenty years ago. As it became infrequent in its eruptions, and tourists rarely saw them, the name was unconsciously, but mistakenly, transferred to the Mud Volcano, which has none of the characteristics of a geyser.

The locality where these objects are found has considerable historic interest. The ford just below the Mud Volcano was long used by the hunters and trappers who passed up and down the river. Folsom crossed it in 1869, and the Washburn party in 1870. The Nez Percés encamped here two days, in 1877, and here transpired a part of the episode elsewhere related. Hither came General Howard in pursuit of the Indians, although he did not cross the river at this point.

Trout Creek (9.5 miles) has a most peculiar feature, where the tourist route crosses it, in the form of an extraordinary doubling of the channel upon itself. It resembles in form the trade-mark of the Northern Pacific Railroad.

Sulphur Mountain (11.5 miles) is half a mile back from the main route. At its base is a remarkable sulphur spring, always in a state of violent ebullition, although discharging only a small amount of water. This is highly impregnated with sulphur, and leaves a yellow border along the rivulet which carries it away. The best time to visit Sulphur Mountain is on a clear, sharp morning. The myriad little steam vents which cover the surface of the hill are then very noticeable.

Hayden Valley is a broad, grassy expanse extending several miles along the river, and far back from it on the west side. It was once a vast arm of the lake. It comprises some fifty square miles, and is an important winter range for the Park buffalo and elk.

"Spurgin's Beaver Slide" (13.5 miles) is back from the road, and is the place, described in a previous chapter, where Captain Spurgin, in 1877, let Howard's wagon train down the steep side of the mountain. The evidences of his work are still distinctly visible.

The river along the lower portion of Hayden Valley is the most tranquil and lovely stream imaginable—broad, deep, transparent, flowing peacefully around its graceful curves, disturbed only by the splashing trout which inhabit it. There is little here to suggest the mad turmoil into which it is soon to plunge. At a point fifteen miles below the lake, the river and road are forced by the narrowing valley close together. The stream becomes suddenly broken into turbulent cascades as it dashes violently between precipitous banks and among massive boulders.

The road also becomes decidedly picturesque. Hung up on the almost vertical cliff overlooking the rapids, it forms a short drive unsurpassed for interest anywhere else in the Park. At one point it crosses a deep ravine over the highest bridge on the road system. Just to the left of this bridge, in the bottom of the ravine, still stands the tree upon which some white man carved his initials away back in 1819.

Half a mile below the head of the rapids, the river suddenly contracts its width to less than fifty feet, turns abruptly to the right, and disappears. It is the *Upper Falls* of the Yellowstone. In some respects, this cataract differs from almost any other. Although the ledge over

Outlet of Yellowstone Lake.

which it falls is apparently perpendicular, the velocity of flow at the crest of the fall is so great that the water pours over as if on the surface of a wheel. Visitors at Niagara have noticed the difference in this respect between the almost vertical sheet of water on the American side and the well-rounded flow at the apex of the Horseshoe Fall. The height of the Upper Fall of the Yellowstone is 112 feet.

From this point, the character of the scenery is wild and rugged. A ride of a few hundred yards brings the tourist to a sharp bend in the road, which at once unfolds to him the whole vista of the *Grand Cañon of the Yellowstone.* The sight is so impressive and absorbing that the chances are he will cross the ravine of *Cascade Creek* without even noticing the lovely *Crystal Falls* almost beneath his feet.

The *Cañon Hotel* is half a mile beyond Cascade Creek, in an open park, a little way back from the brink of the Cañon. From its porch, the crest of Upper Fall can be seen, and the roar of both cataracts is distinctly audible.

The Grand Cañon of the Yellowstone is acknowledged by all beholders to stand without parallel among the natural wonders of the globe. Other cañons, the Yosemite, for example, have greater depths and more imposing walls; but there are none which, in the words of Captain Ludlow, "unite more potently the two requisites of majesty and beauty." The cañon itself is vast. A cross-section in the largest part measures 2,000 feet at the top, 200 feet at the bottom, and is 1,200 feet deep, giving an area of over thirty acres. But such a gorge in any other part of the world would not be what it is here. Its sides would soon be clothed with vegetation, and it would be simply an im-

mense valley, beautiful, no doubt, but not what it is in the Yellowstone Park.

There are three distinct features which unite their peculiar glories to enhance the beauty of this cañon. These are the cañon itself, the waterfall at its head, and the river below.

It is the volcanic rock through which the river has cut its way that gives the Grand Cañon its distinctive character. It is pre-eminently a cañon of color. The hue has no existence which can not be found there. "Hung up and let down and spread abroad are all the colors of the land, sea and sky," says Talmage, without hyperbole. From the dark, forest-bordered brink, the sides descend for the most part with the natural slope of the loose rock, but frequently broken by vertical ledges and isolated pinnacles, which give a castellated and romantic air to the whole. Eagles build their nests here, and soar midway through the vast chasm, far below the beholder. The more prominent of the projecting ledges cause many turns in the general course of the cañon, and give numerous vantage places for sight-seeing. *Lookout Point* is one of these, half a mile below the Lower Falls. *Inspiration Point,* some two miles farther down, is another. The gorgeous coloring of the cañon walls does not extend through its entire length of twenty miles. In the lower portion, the forests have crept well down to the water's edge. Still, it is everywhere an extremely beautiful and impressive sight. Along the bottom of the cañon, numerous steam vents can be seen, one of which, it is said, exhibits geyseric action. In places, the cañon walls almost shut out the light of day from the extreme bottom. Lieutenant Doane, who made the dangerous descent several miles below the Falls, records that " it was about three o'clock P. M., and stars

could be distinctly seen, so much of the sunlight was cut off from entering the chasm."

The *Lower Fall* of the Yellowstone must be placed in the front rank of similar phenomena. It carries not one-twentieth of the water of Niagara, but Niagara is in no single part so beautiful. Its height is 310 feet. Its descent is very regular, slightly broken by a point of rock on the right bank. A third of the fall is hidden behind the vast cloud of spray which forever conceals the mad play of the waters beneath; but the mighty turmoil of that recess in the rocks may be judged from the deep-toned thunder which rises in ceaseless cadence and jars the air for miles around.

To many visitors the stream far down in the bottom of the cañon is the crowning beauty of the whole scene. It is so distant that its rapid course is diminished to the gentlest movement, and its continuous roar to the subdued murmur of the pine forests. Its winding, hide-and-seek course, its dark surface where the shadows cover it, its bright limpid green under the play of the sunlight, its ever recurring foam-white patches, and particularly its display of life where all around is silent and motionless, make it a thing of entrancing beauty to all who behold it.

It is not strange that this cañon has been a theme for writer, painter and photographer, from its discovery to the present time. But at first thought it is strange that all attempts to portray its beauties are less satisfactory than those pertaining to any other feature of the Park. The artist Moran acknowledged that "its beautiful tints were beyond the reach of human art;" and General Sherman said of this artist's celebrated effort: "The painting by Moran in the Capitol is good, but painting and words are unequal to the subject."

In photography, the number of pictures by professional and amateur artists that have been made of this cañon is prodigious. But photography can only reproduce the form; it is powerless in the presence of such an array of colors as here exists.

The pen itself is scarcely more effective than the pencil or camera. Folsom, who first wrote of the cañon, frankly owned that "language is entirely inadequate to convey a just conception of the awful grandeur and sublimity of this masterpiece of nature's handiwork." Time has shown this confession to be substantially true. From the clumsy work of the casual newspaper scribe, to the giddy flight of that eminent clergyman, who fancied he saw in this cañon a suitable hall for the great judgment, with the nations of the earth filing along the bottom upon waters "congealed and transfixed with the agitations of that day," all descriptions do injustice to their subject. They fall short of their mark or overreach it. They are not true to nature. We shall, therefore, pass them by, and shall commend our readers to a study of this great wonderwork from the pine-clad verge of the Grand Cañon itself.

Back perhaps a quarter of a mile from Inspiration Point, but within fifty yards of the brink of the cañon, is a huge rectangular block of granite* which rests alone in the woods, a most singular and striking object. It is evidently an intruder in unfamiliar territory, for there is not a particle of granite outcrop known to exist within twenty miles. It must have been transported to this place from some distant quarry by the powerful agencies of the Glacial Epoch.

Right Bank of the Cañon. Half a mile above the Upper

* Approximately 24′ x 20′ x 18′ high.

Upper Falls of the Yellowstone.

LOWER FALLS THROUGH RAIN MIST.

Fall is a concrete steel bridge, of the design known as the *Melan Arch,* spanning the Yellowstone River and giving access to the right bank. The arch has a span of 120 feet, one of the longest of the kind yet built. From this bridge a road leads down the cañon as far as *Artist Point,* from which Thomas Moran drew his inspiration for the celebrated painting which now adorns the Capitol at Washington.

This road affords the best possible view to be had of the Upper Falls, and leads to the head of a long stairway by which a safe descent can be made to the bottom of the cañon at the foot of the Lower Falls. This is a side excursion well worth taking, though a rather laborious one. The view from below is very impressive and the proximity to the falls gives one a sense of the terrible power of this great cataract, which can not be realized when seen from a distance. Fortunately, the prevailing breeze wafts the cloud of spray toward the left bank of the river and leaves the point at which the observer stands comparatively unobscured.

The guide who conducts tourists through this part of their wanderings, has an extremely interesting surprise to which he treats every one—a surprise quite in harmony with the general character of the surroundings. Taking his protege to the river's edge he asks him to reach down and dig with his fingers into the sandy bottom. Obeying instructions, the startled tourist suddenly jerks his hand out as if from a bed of slumbering coals. In fact, the bottom of the river is a mass of boiling springs. The cold water flowing above obscures their presence and but for an accidental discovery they might have remained unknown indefinitely.

To the eastward of the Grand Cañon are several interesting hot springs areas, and there is one notable group at the southern base of Mt. Washburn. It resembles in some degree Mud Geyser and is considered by many as excelling that feature in interest. It is to one of the features in this locality that the name *Devil's Inkstand* applies.

CHAPTER XIX.

A TOUR OF THE PARK.

Grand Cañon to Tower Falls.

Distance twenty miles. The tourist, after leaving the Grand Cañon, enters upon the true scenic portion of the route. Hitherto he has been absorbed with those peculiar phenomena on which the fame of the Park chiefly depends. He has doubtless often expressed his surprise that one can travel so far in the very heart of the Rocky Mountains and see so little near at hand of the rugged grandeur which is associated in his mind with the scenery of those mountains. The ride over Mt. Washburn will satisfy any reasonable expectation he may have in this regard.

For three miles after leaving the hotel the road extends across a rolling forested country and reaches the base of the mountain at the crossing of the east fork of Cascade Creek. Here the ascent begins, and here begins also that marvelous development of scenery which perhaps has no parallel on any other highway in the world. In the course of a mile or so the road rises above the dense forests on the right and the broad champaign to the south unfolds itself to the view with the distant peaks of Sheridan and the Tetons and of the Absaroka Range defining the limit of vision. Winding in and out of deep ravines, and over a high spur of Dunraven Peak everywhere among grassy slopes or scattered growths of evergreen where the wild game find ideal pasturage, the labor of ascent is almost forgotten in the constant attraction of the surroundings. There is no need to look far away to see the beauty of

nature. It is spread in extravagant profusion all around. The forest growths exhibit that superb regularity of form and richness of color that characterize the spruce and fir in the higher altitudes. The mountain side is one vast flower garden, where the columbine, larkspur, paintbrush and kindred blossoms give a rich tone to the green forest glades.

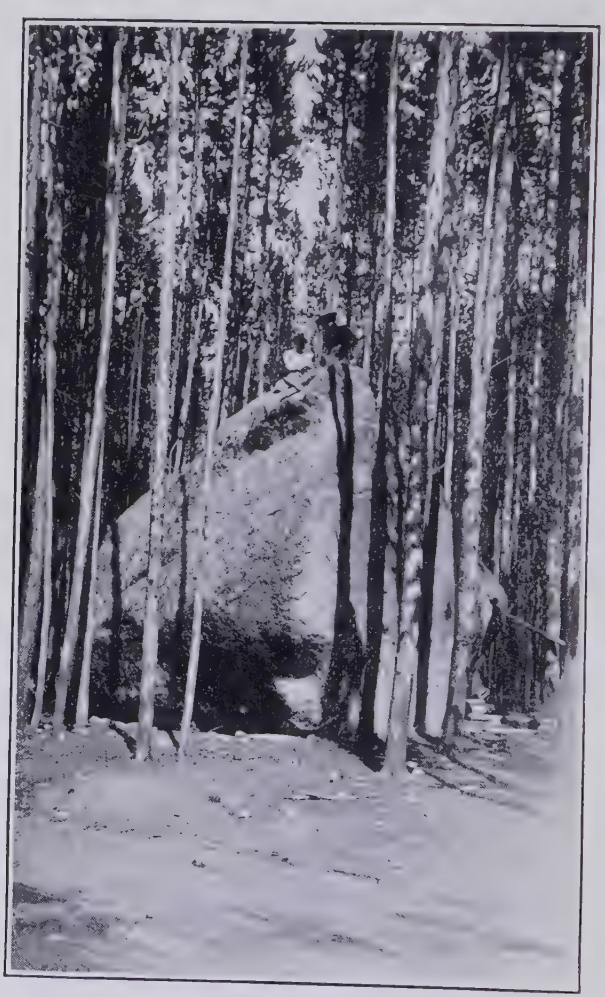
At a point where the road rises a hundred feet or more to avoid an extensive marshy tract, Yellowstone Lake comes into view, but it is lost again as the road descends into

Dunraven Pass (7 miles). This crossing leads from the south to the north slope of the Washburn Range and carries the tourist to the headwaters of Tower Creek, or its eastern tributary, Carnelian Creek It is a very practicable mountain pass, as unlike Sylvan Pass as are the rocky walls of the Grand Cañon to the grassy slopes of Hayden Valley. It required no heavy draft upon the skill of the engineer to select it as the best crossing of the range.

At Dunraven Pass the road divides. The low line passes directly through and skirts the steep western slope of Washburn on a nearly level grade until it reaches the crest of a long spur, locally known as the "hog back," the great northern buttress to the mountain, and nature's well made stairway to the summit from that side. This lower route gives a short cut for travelers who do not care to pass over the mountain.

To enable visitors to reach the top of the mountain, a side road, or "loop," branches off from the main line in the Pass, climbs up the southwest slope to the summit, and descends along the crest of the spur on the north until it joins the main line.

The development of the scenery as the road ascends the



Granite Boulder, near Inspiration Point.

mountain from Dunraven Pass to the summit (3 miles), constitutes one of the most interesting features of the entire Park tour. As the steep grade carries the tourist rapidly into a higher altitude, new objects of interest come into view in all directions far and near. Again the silver surface of Yellowstone Lake stands out in its dark forest environment and the winding course of the Yellowstone can be traced nearly to the head of the rapids. The main view on the first portion of the climb lies to the southwest with Mt. Sheridan and the Tetons the most conspicuous objects. A great rift in the earth's surface in the near foreground shows where the Grand Cañon lies, and clouds of vapor, seen under favorable conditions, indicate the localities of the falls.

After an ascent of about a mile the road crosses a bald ridge—the south spur of the mountain—and brings at once into view the whole southern half of the Absaroka Range. The rugged peaks that bound the eastern horizon, the forest covered areas nearer by, the central portion of the Grand Cañon and the green, grassy parks along the base and sides of the mountain, almost at the feet of the tourist, are among the new attractions which the road unfolds to his view.

A short drive along the crest of the ridge toward the Washburn summit, leads to a depression or "saddle" between the main mountain and a prominent peak between it and Dunraven Pass. Here again the view changes completely, and the tourist now looks out upon an entirely new landscape spread over the northwestern portion of the Park. The Gallatin Range, with Electric, Sepulcher and Bunsen Peaks, and even Cinnabar Mountain and the "Devil's Slide," are distinctly visible if the air be clear. In the nearer foreground is the vast amphitheater which

comprises the watershed of Tower Creek and its tributaries, one of the most magnificent forest scenes to be found in the mountains. To the north are the serried peaks of the snowy range beyond the border of the Park, and on the hither side of the boundary are Crescent and Garnet Hills, familiar landmarks near the beautiful spot which will probably always bear the name of John Yancey.

This noble landscape grows and expands as the road zigzags for a mile up the western slope of the mountain. The road is itself an object of interest here, from the great difficulty of construction and the dangerous situations through which it passes. It leads to the crest of a rocky ridge that juts out directly south from the main summit and is so broken and wild that it might well appall an engineer who should seek to find a passage through it. But the passage was found and the road built, and after breaking through a comb of rock leads to another "saddle" between the Washburn summit and a slightly lower one directly to the east.

Again the scene shifts completely and the tourist looks out upon the country around the northeast corner of the Park, where lies one of the most rugged mountain masses in the United States. Scores of giant peaks stand silhouetted against the sky, among them Index and Pilot, well-known landmarks in all that region. In the nearer foreground is the valley of Lamar River with its large tributaries gashing the great ranges to the north, while close in at the base of the mountain, is the lower portion of the Grand Cañon of the Yellowstone The entire mountain side below is a variegated landscape where dense forests, open evergreen groves, rolling grassy hills, and green patches of the quaking aspen, vie with each other in composing a scene of transcendent beauty and interest.

Now follows a short, spiral climb, which soon terminates at the summit of *Mt. Washburn* (10 miles), where the successive scenes which we have attempted to describe stand forth in one all-embracing panorama, the like of which can hardly be found elsewhere upon the accessible portions of the globe. It is idle to undertake a description of this wonderful panorama—it includes too much and assumes too many changes in the course of even a single day. It is one thing in the morning, another in the evening; beautiful in the brilliant sunlight of this region, and entrancing in the wild tempests that have beaten upon its scarred face for ages; but always, and in whatever guise, it is sublime.

The one drawback to the pleasure of visiting Mt. Washburn is the heavy wind that generally prevails there. One has but to see the tempest-torn trees that grow on its slopes with a permanent list to the northeast to understand the power of these winds and their prevailing direction. The government has ameliorated this condition as far as possible by erecting a suitable shelter on the summit from which the landscape can be viewed in comparative comfort. It is always desirable to make the ascent early in the day, as the wind does not generally reach its full force until about noon.

Mt. Washburn is the most celebrated peak in the Park, and the first to receive its present name. Its prominence justifies its notoriety, but the real cause of it is the fact that for eight years the main tourist route lay across it. From its summit the Washburn party received the first definite confirmation of the truth of the rumors that led them into this region. All reports and magazine articles which first gave a knowledge of the Park to the world were written by persons who had crossed this mountain. As the view from its summit is comprehensive and grand, cover-

ing almost the entire Park, it of course figured prominently in all narratives. Visitors fell into the custom established by the first explorers, of leaving their cards in a receptacle for the purpose on the summit. Many eminent names are to be seen there. It is a matter of congratulation that the progress upon the road system has restored this mountain to its former place in the tourist route.

Here, on the summit of this great mountain, the visitor may profitably exercise whatever imagination nature has given him and picture in his mind the eventful history of the country embraced within the scope of his vision. For this was the central point in the building up of the Park. Let him go back to those primal times when everywhere beneath and around him were the rolling waves of the sea, except that far on the horizon in various directions the sky line denoted elevations above the surface of the water. These were the first land, but where the park now is none had yet appeared.

Then comes a time when the earth's crust is pushed upward; the water slides off the land and the space of the ocean is reduced. The plastic crust is creased and folded and great mountains are formed, among them doubtless the one on which we are standing. The Park becomes dry land—a great basin surrounded by lofty hills.

The forces of life assert themselves; vegetation springs up; rivers flow down to the sea, and the sun daily illumines a world rejoicing in the beauty of growth.

Then comes a reign of terror, for the very earth bursts forth with fire and ashes until the sun is hid and the world is shrouded in darkness. The giant trees are overwhelmed, broken down and buried deep in the lifeless mass. The valleys are filled up, new mountains are built, and the face of nature is radically changed. The vast amphitheater at

the feet of the visitor, as he stands facing westward, is one of the centers of these volcanic tempests.

After a time the fires cease, and nature, ever quick to respond, puts forth again tree and flower, and a new world arises on the ruins of the old. Again the crater breaks forth; terror and desolation reign, and the beauty of life is smitten in dust and ashes.

So it continues for countless centuries until the fury of the volcano is spent and its dominion comes to an end; and until the vast basin, which was formed when the land arose from the sea, is filled with the debris cast forth from the earth's interior.

And now a marvelous transformation ensues. Heat is followed by cold, fire gives way to snow, and the reign of lava is succeeded by the reign of ice. The sky is again obscured, no longer with smoke and ashes, but with silvery snow, which falls until it enrobes the earth in a mantle of ice as deep as the lava beneath it. Yielding to its weight, it slides with infinite procrastination down the slopes, carving out new valleys and cañons, scoring the rocky hillsides, breaking off boulders, rounding and polishing them like marbles, and moulding the landscape into new forms.

At last the ice king is shorn of his power, the glaciers melt and drop their burden of rocks and debris; the sun resumes its sway and life begins again. Then for the first time the country around this mountain looked somewhat as it does to-day, though to the south it was very different. The waves of Yellowstone Lake washed its base, and the Cañon and Falls did not exist. Presently some change occurs and the waters commence flowing north. They cut into the soft, decomposed rock, and year after year dig deeper into the color-laden earth, until they form the vast chasm that half way encircles the mountain.

From the passing of the ice age, on through periods of time which we can not measure, the Park grows to its present form. The pent-up but not extinguished fires cover the face of the country with geysers and springs and strange suggestions of the nether world. But the milder forces of nature are also doing their work. The hillsides are clothed with forests and flowers. New forms of life arise and the stately elk and gentle deer are seen among the trees. Then man appears—aboriginal man—few in numbers, and armed with the crude weapons of a primitive age.

Time rolls on and at length there comes a man of different skin and costume, wending his solitary way across this mighty wilderness. One standing on this summit might have seen him clambering up its southern face, a "thirty pound pack" on his back, perhaps coming to this very point to study his surroundings, and then disappearing to the northward not to be seen again. It was the coming of the white man.

Others follow in his train, in hunter garb, and for many years roam over the country like the Indians who came before them. At last a larger company appear, hunters, not after the game of the forest, but the wonders of nature of which they had heard strange reports. They climb this mountain, give it a name, and go their way. Others in ever increasing number follow, and at last come pick and spade and dynamite, and a roadway is carved up the rocky slopes to this very summit, that man may come here, through all future time, and study the handiwork of nature as it lies outspread before him from the summit of Mt. Washburn.

The long ride down the northern slope of the mountain is full of general interest, although there are no notable

features immediately on the route. It follows the long spur already mentioned as the great northern support of the mountain and the natural line of ascent to its summit. The road is first on one side of the crest and then on the other, and the scene is thus constantly shifting and always with renewed interest. It finally plunges into a dense forest along the lower course of *Tower Creek,* and after many curves and windings in getting down from a lofty bench, reaches the picturesque situation in the vicinity of

Tower Falls (20 miles).—This waterfall is the most beautiful in the Park, if one takes into consideration all its surroundings. The fall itself is very graceful in form. The deep cavernous basin into which it pours itself is lined with shapely evergreen trees, so that the fall is partially screened from view. Above it stand those peculiar forms of rock characteristic of that locality—detached pinnacles or towers which gave rise to the name. The lapse of more than thirty years since Lieutenant Doane saw these falls, has given us nothing descriptive of them that can compare with the simple words of his report penned upon the first inspiration of a new discovery:

"Nothing can be more chastely beautiful than this lovely cascade, hidden away in the dim light of overshadowing rocks and woods, its very voice hushed to a low murmur, unheard at the distance of a few hundred yards. Thousands might pass by within half a mile and not dream of its existence; but once seen, it passes to the list of most pleasant memories."

The portion of the Park to which the tourist has now arrived is the most desirable of all in which to spend a season of rest and recuperation. It is full of attractions for the lover of nature and the scientific inquirer. The scenery in the immediate vicinity of the falls and for

two miles below, is very different from anything else in the Park and is not surpassed anywhere for variety and beauty. It is the lower end of the Grand Cañon, but its character is very different from that farther up. The gorge is about 500 feet deep, with nearly vertical sides, and the green waters of the river run through it as in the bottom of a trough, flecked everywhere with white patches which show how rapidly it flows. Along the sides of the cañon well up toward the brink are fine examples of columnar basalt walls, so regular in outline that they look like great stone fences erected there by the hand of man. The peculiar towers or pinnacles to which we have already referred, occur all along this stretch of the river, and one of them is probably the most remarkable feature of its kind in the world. It rises from the bottom of the cañon close to the edge of the water on the left bank to a height of fully 300 feet above the water surface. It is locally called the *Needle*. It was seen by Folsom in 1869, and then forgotten until it was rediscovered a few years ago. It stands like a solitary watch tower to guard the lower entrance to the Grand Cañon, and will henceforth remain one of the rare wonders of the Park.

All along this stretch of the river are abundant evidences of internal heat. There are a great many small springs and steam vents, and the odor of sulphur is very apparent. About two miles below Tower Creek, just to the left of the road, in an open space covered with hot springs deposit, is a spring which has been used for bathing purposes for more than thirty years.

Just above the mouth of Tower Creek is the old Bannock Ford over the Yellowstone, a crossing of immemorial antiquity, and the same that was used by Colter in 1807.

TOWER FALLS.

Junction Butte is on the right bank of the Yellowstone, in the angle between that stream and the East Fork. It stands not only near one of the most important stream junctions in the Park, but also near a not less important road junction. It is a very striking object. Its summit is nearly flat, and its sides near the summit are perpendicular. Below this is a steep slope composed of enormous masses of finely broken stone disengaged from the cliff by the force of the elements. It is a fitting landmark for its important situation.

Baronett Bridge, which crossed the Yellowstone just opposite Junction Butte, was the first bridge ever built over that river in any part of its course. It was built by the well-known mountaineer, C. J. Baronett, in the spring of 1871, for the convenience of Clark's Fork miners. It was partially destroyed by the Nez Percés in 1877, but was repaired by Howard's command, and still further repaired the following year by Baronett and Norris. It was replaced in 1880 by a more substantial structure, and this itself has been replaced by a steel bridge located a half mile further up stream.

"Yancey's" or Pleasant Valley, is the name of a beautiful spot in which a long familiar character in Park history, "Uncle" John Yancey, dwelt for many years, and kept a rude lodging place for the convenience of visitors to that part of the Park.

Lost Creek Cañon and *Falls,* hidden in the forest a half mile back from the road as it crosses the plains near the old bathing spring, is well worthy of a visit. It reminds one somewhat of the falls of Minnehaha. The formation of the walls is very unusual, and the water pours over the brink in a light spray which forms, with the surrounding verdure, a scene of quiet beauty rarely found in so wild

and rough a country. It is a spot which the visitor can not leave without an involuntary feeling of regret. Near the outlet of the cañon is one of the ideal camping grounds of the Park, which has been utilized by hundreds of visitors. With it are associated some of the most pleasant memories in the tourist history of this region.

The *Petrified Trees,* two weather-scarred stubs, ancient monuments of a once more active period of vegetable growth in this region, will gratify the curiosity of the tourist who has not time to visit the more extensive region of petrifactions further east. They are located on the side of a ravine, a quarter of a mile to the left of the road and about four miles from Tower Falls.

An extensive region full of interesting features, in which one can profitably spend months of study and research, is the valley of Lamar River and its tributaries. In many respects this is the most interesting section of the Park. It is the largest treeless tract on the Reservation, and is the great winter pasture of the elk, which gather here in thousands as soon as the fall snows come. In the summer it is the chief grazing ground of the antelope.

Amethyst Mountain, Specimen Ridge and the *Fossil Forests* are names at once suggestive of the action of geological agencies which have been described in another chapter. Amethyst, limpid quartz, milky quartz, chalcedony, carnelian, prase, chrysoprase, banded agate, flint, jaspers of all colors, semiopal, calcite, and many other varieties abound. The forest petrifications present one of the most interesting scientific problems in the Park.

The *Lamar River Cañon* (7 miles above Junction Butte) is a gorge about half a mile long, the chief characteristic of which is the enormous number and size of boulders that have fallen into it. Some of them are almost spherical

in shape, and are as smooth as if from the hand of a stone glazer. They are piled up like billiard balls, to such a depth that in some places the stream at low water flows entirely out of sight beneath them.

Amethyst Falls is a pretty cascade near where a small stream of the same name empties into Lamar River.

Soda Butte (15 miles above Junction Butte) and *Soda Butte Cañon* are worthy of much attention. The cañon in particular is as wonderful a bit of scenery as any mountains afford. It is everywhere rugged, majestic and imposing, and there is no point in its twelve miles' length that does not present a landscape deserving of the tourist's careful study.

Trout Lake, on a tributary of Soda Butte Creek, is one of the gems of these mountains, and as its name implies, an ideal fishing resort.

Cooke City is a small mining camp located on the northeast border of the Park. It is older than the Park itself, having been established in 1870.

Death Gulch, a side ravine in the valley of Cache Creek, first tributary of Lamar River above Soda Butte Creek, is a spot about which there hangs a great deal of mystery. It is claimed by reputable authorities, on the strength of personal observation, that it emits a deadly gas, and that animals, even of the larger species, have been found dead there in considerable numbers. The truth of these statements has been strenuously denied by others. The writer himself once visited the spot for the express purpose of settling the question in his own mind, and was unable to find any evidence of the gas or of any animals killed by it. The slope of the ravine is such that the accumulation of a heavy gas is impossible, unless dammed up by snow drifts in winter. While the positive statements of reputa-

ble observers can not easily be set aside, it is remarkable that all the evidence which they claim to have witnessed should disappear so quickly and so completely. Take it all in all, Death Gulch is one of the mysteries of the Park still awaiting solution.

The *Hoodoo Region,* near the head of Miller Creek, beyond the east boundary of the Park, furnishes probably the most striking example in existence of the effects of erosion and wind action upon masses of moderately soft rock. The region was discovered by miners in 1870, but was first explored and reported upon by Colonel Norris in 1880, who thus describes it:*

"Nearly every form, animate or inanimate, real or chimerical, ever actually seen or conjured by the imagination, may here be observed. Language does not suffice to describe these peculiar formations; sketches may probably do something, and photographs more, to convey a conception of their remarkable character, but actual observation is necessary to adequately impress the mind with the wild, unearthly appearance of these eroded Hoodoos of the Goblin Land. These monuments are from fifty to two or three hundred feet in height, with narrow, tortuous passages between them, which sometimes are tunnels through permanent snow or ice fields, where the Bighorn sheep hide in safety; while the ceaseless but ever changing moans of the wild winds seem to chant fitting requiems to these gnome-like monuments of the legendary Indian gods."

From Tower Falls to Mammoth Hot Springs (22 miles) the route presents nothing of unusual interest, although the scenery is everywhere of a pleasing and satisfactory character. The road first climbs the long hill above Yan-

* Page 8, Annual Report, Superintendent of the Park, for the year 1880.

THE HOODOOS.

cey's, four miles, much of the way in dense forests, and finally emerges at the summit in a deep gorge through the hills called the *Crescent Hill Cañon.* Immediately upon leaving this ravine the road passes over a little ridge from which the tourist has an unobstructed view of Electric and Bunsen Peaks, Mt. Everts, Terrace Mountain and the roadway leading up from Mammoth Hot Springs, by which he started on his tour a few days before. To the right lies the Valley of the Yellowstone, the stream flowing out of sight fully 1,500 feet below him. The slopes of the mountain on the farther shore, seamed with the valleys of numerous tributaries, dotted here and there with groves of quaking aspen, but generally open and free of forest growths, compose a landscape which never fails to call forth expressions of delight from those who see it for the first time.

The *Third Cañon* of the Yellowstone (the third above the Great Bend at Livingston, the Grand Cañon being the fourth) begins near the mouth of Blacktail Deer Creek and continues to the north boundary. It is rarely visited by tourists on account of its inaccessibility, but it is well worth seeing as an example on a large scale of the grandeur and power of the forces of nature that have thus carved a way for the river through the very heart of the mountains.

From the exit from Crescent Hill Cañon the road descends by a gentle grade all the way to the high bridge over the Gardiner, and a quick drive of an hour and a half brings the visitor to Mammoth Hot Springs, where his Park tour and our present labors end together.

APPENDIX.

MAP INDEX.

The following list contains all the geographical names in the Park, with marginal references to aid in locating them upon the map.

MOUNTAIN RANGES, PEAKS, BUTTES, RIDGES, HILLS.

[The numbers in the third column denote elevations. These are taken from the latest map by the United States Geological Survey, and are the same as that of the one hundred foot contour nearest the summit. The true elevation of the ultimate peak is in each case slightly greater, lying between the figure given and an altitude one hundred feet higher.]

Name.	*Map Reference.*	*Altitude.*
Abiathar Peak	C : 14	10,800
Absaroka Range	A-X : 12-16	
Amethyst Mtn	F : 11	9,423
Antler Peak	E : 4	10,200
Atkins Peak	N : 14	10,900
Avalanche Peak	L : 13	10,500
Bannock Peak	D : 4	10,400
Barlow Peak	Q : 10	9,500
Baronett Peak	C : 13	10,300
Big Game Ridge	Q-J : 9-11	
Birch Hills	R : 4	7,300
Bison Peak	D : 12	8,800
Bobcat Ridge	T : 9	9,500
Bunsen Peak	D : 6	9,100
Cathedral Peak	J : 13	10,600
Chittenden, Mt	K : 12	10,100
Cinnabar Mtn	A : 5	7,000
Colter Peak	O : 13	10,500
Crags, The	E : 3	9,000
Crescent Hill	D : 9	7,900
Crow Foot Ridge	D-E : 5	9,700
Doane, Mt	M : 13	10,500
Druid Peak	D : 12	9,600
Dunraven Peak	F : 9	9,700
Eagle Peak	O : 14	10,800
Echo Peak	E : 4	9,600
Electric Peak	B : 4-5	11,155
Elephant Back	J : 9	8,600
Everts, Mt	C : 7	7,900
Factory Hill	O : 8	9,500
Flat Mtn	N : 9	9,000
Folsom Peak	E : 8	9,300
Forellen Peak	T : 5	9,700
Gallatin Range	A-F : 1-4	
Garnet Hill	C : 9	7,000
Giant Castle	K : 14-15	10,000
Gibbon Hill	H : 6	8,600
Gravel Peak	T : 11	9,600
Gray Peak	C-D : 4	10,300
Grizzly Peak	L : 12	9,700

Name.	Map Reference.	Altitude.
Hancock, Mt.	R : 10	10,100
Hawks Rest	R : 14	9,800
Hedges Peak	G : 9	9,500
Holmes, Mt.	F : 4	10,300
Horseshoe Hill	E : 6	8,200
Hoyt, Mt.	L : 13	10,400
Huckleberry Mtn.	S : 7	9,700
Humphreys, Mt.	N : 14	11,000
Huntley, Mt.	E : 4	9,900
Index Peak	C : 16	11,740
Joseph Peak	C : 4	10,300
Junction Butte	B : 10	6,500
Lake Butte	K : 11	8,600
Landmark, The	F : 6	8,800
Langford, Mt.	M : 13	10,600
Mary Mtn.	J : 7	8,500
Moran, Mt.	W : 5	12,800
Needles, The	E : 14	9,600
Norris, Mt.	E : 13	9,900
Observation Peak	G : 8	9,300
Obsidian Cliff	F : 6	7,800
Paint Pot Hill	H : 6	7,900
Pelican Cone	I : 12	9,580
Pilot Knob	C : 16	11,977
Pinon Peak	S : 10	9,600
Prospect Peak	D-E : 8	9,300
Pyramid Peak	J : 14	10,300
Quadrant Mtn.	D : 4	10,200
Red Mt. Range	P : 7-8	
Reservation Peak	M : 14	10,600
Roaring Mtn.	F : 6	8,000
Saddle Mtn.	H : 15	11,100
Schurz, Mt.	N : 14	9,500
Sepulcher Mtn.	B-C : 5-6	9,500
Sheepeater Cliffs	D : 7	7,500
Sheridan, Mt.	P : 8	10,250
Signal Hills	M : 12	9,500
Silver Tip Peak	K : 13	10,400
Specimen Ridge	E : 11	8,700
Stevenson, Mt.	M : 13	10,300
Storm Peak	E : 8	9,500
Survey Peak	T : 4	9,200
Table Mtn.	O : 14	10,800
Terrace Mtn.	C : 6	8,100
Teton, The G'nd.	Off Map	13,691
Three Rivers Peak	E : 4	9,900
Thunderer, The	D : 14	10,400
Top Notch Peak	L : 13	10,000
Trident, The	Q-R : 14	10,000
Trilobite Point	F : 4	9,900
Turret Mtn.	P : 14	10,400
Twin Buttes	K : 14	8,400
Washburn, Mt.	F : 9	10,000
White Peak	F : 4	9,800
Wildcat Peak	T : 8	9,800
Yount Peak	Off Map	12,250

MOUNTAIN PASSES.

Craig Pass	L : 6	8,300
Jones Pass	K : 12	9,450
Norris Pass	M : 6	8,260
Raynolds Pass	Off Map	6,911
Sylvan Pass	L : 13	8,650

LAKES.

Beach Lake	K : 8	8,150
Beaver Lake	F : 6	7,415
Beula Lake	R : 5	7,530
Bridger Lake	R : 13	7,900
Delusion Lake	M : 9	7,800
Dryad Lake	K : 8	8,250
Duck Lake	M : 7	7,850
Fern Lake	H : 11	8,150
Frost Lake	I : 14	7,350
Gallatin Lake	E : 4	9,000
Goose Lake	K : 4	7,100
Grassy Lake	R : 5	7,150
Grebe Lake	G : 8	7,950
Grizzly Lake	F : 5	7,490
Heart Lake	P : 9	7,469
Henry Lake	Off Map	6,443
Hering Lake	R : 5	7,530
Indian Pond	J : 11	7,750
Isa Lake	L : 6	8,250
Jackson Lake	U-W : 6	6,000

Name.	Map Reference.	Altitude.
Leigh Lake	W : 5	
Lewis Lake	O : 7	7,720
Loon Lake	R : 3	6,400
Lost Lake	M : 7	8,500
Madison Lake	N : 4	8,250
Mallard Lake	L : 5	8,000
Mary Lake	J : 7	8,100
Mirror Lake	G : 12	8,700
Obsidian Lake	E : 6	7,650
Riddle Lake	N : 8	7,950
Shoshone Lake	M-N : 5-6	7,740
Summit Lake	M : 3	8,450
Swan Lake	D : 6	7,200
Sylvan Lake	L : 13	8,300
Tern Lake	I : 11	8,150
Trout Lake	D : 13	6,850
Turbid Lake	K : 11	7,800
Twin Lakes	G : 6	7,450
Wapiti Lake	H : 11	8,500
White Lake	I : 11	8,150
Woods, Lake of the	F : 6	7,550
Yellowstone L.	K-O : 8-12	7,741

STREAMS.

[Map locations refer only to outlets, or to points where streams pass off the limits of the map. Altitudes refer to the same points, but are given only in the most important cases.]

Name.	Map Reference.
Agate Creek	E : 10
Alum Creek	H : 9
Amethyst Creek	E : 12
Amphitheater Creek	D : 13
Antelope Creek	E : 10
Arnica Creek	L : 8
Aster Creek	P : 7
Astringent Creek	J : 12
Atlantic Creek	S : 13
Badger Creek	P : 13
Basin Creek	Q : 9
Bear Creek	B : 7
Bear Creek	K : 11
Beaver Creek	O : 9
Beaver Dam Creek	O : 12
Bechler River	R : 1
Berry Creek	U : 6
Black-tail Deer Creek	B : 8
Bluff Creek	H : 10
Bog Creek	H : 10
Boone Creek	T : 1
Bridge Creek	K : 9
Broad Creek	F : 10
Buffalo Creek	D : 11
Burnt Creek	E : 10
Cache Creek	F : 13
Calfee Creek	F : 13
Canyon Creek	1 : 5
Carnelian Creek	E : 9
Cascade Creek	G : 8
Chalcedony Creek	E : 12
Chipmunk Creek	O : 11
Clear Creek	L : 11
Cliff Creek	Q : 13
Clover Creek	G : 13
Cold Creek	H : 14
Columbine Creek	M : 11
Conant Creek	T : 1
Cotton Grass Creek	H : 9
Cougar Creek	G : 2
Coulter Creek	R : 8
Crawfish Creek	R : 6
Crevice Creek	C : 7
Crooked Creek	R : 10
Crow Creek	K : 15
Crystal Creek	D : 11
Cub Creek	L : 11
Deep Creek	E : 10
De Lacy Creek	M : 6
Duck Creek	G : 3
Elk Creek	D : 9
Elk Tongue Creek	C : 12

Name.	*Map Reference.*
Escarpment Creek	Q : 13
Fairy Creek	J : 4
Falcon Creek	R : 13
Falls River	S : 1
Fan Creek	C : 2
Fawn Creek	C : 5
Firehole River	I : 4
Firehole, Little	L : 4
Flint Creek	F : 13
Forest Creek	Q : 7
Fox Creek	R : 11
Gallatin River	A : 1
Gardiner River (5,360)	B : 6
Geode Creek	C : 8
Geyser Creek	H : 6
Gibbon River	I : 4
Glade Creek	S : 6
Glen Creek	C : 6
Gneiss Creek	G : 1
Gravel Creek	U : 10
Grayling Creek	F : 1
Grouse Creek	O : 10
Harebell Creek	R : 8
Heart River	Q : 9
Hell Roaring Creek	C : 9
Indian Creek	E : 6
Iron Creek	L : 4
Jasper Creek	D : 11
Jay Creek	S : 13
Jones Creek	K : 15
Juniper Creek	J : 6
Lamar River (5,970)	D : 10
Lava Creek	D : 7
Lewis River	R : 7
Lizard Creek	U : 6
Lost Creek	D : 9
Lupine Creek	D : 7
Lynx Creek	Q : 13
Madison River	G : 1
Magpie Creek	J : 9
Maple Creek	G : 2
Mason Creek	L : 16
Meadow Creek	M : 11
Middle Creek	L : 15
Miller Creek	G : 13
Mink Creek	T : 11
Mist Creek	I : 14
Moose Creek	N : 6
Moss Creek	G : 10
Mountain Creek	P : 13
Mountain Ash Creek	R : 3
Nez Perce Creek (7,237)	J : 4
Obsidian Creek	E : 6
Opal Creek	E : 12
Otter Creek	H : 8
Outlet Creek	P : 9
Owl Creek	T : 5
Pacific Creek	W : 11
Panther Creek	D : 5
Pebble Creek	D : 13
Pelican Creek	K : 10
Phlox Creek	Q : 13
Plateau Creek	C : 12
Polecat Creek	S : 6
Quartz Creek	E : 10
Rabbit Creek	K : 4
Raven Creek	J : 12
Red Creek	Q : 8
Rescue Creek	C : 7
Rocky Creek	O : 12
Rose Creek	D : 12
Sedge Creek	K : 11
Senecio Creek	S : 13
Sentinel Creek	J : 4
Shallow Creek	F : 11
Shoshone River	L : 10
Sickle Creek	Q : 10
Slough Creek	D : 10
Snake River (6,808)	W : 8
Soda Butte Creek	E : 12
Solfatara Creek	G : 6
Solution Creek	M : 8
Sour Creek	H : 9
Spirea Creek	R : 6
Spring Creek	M : 5
Spruce Creek	J : 6
Squirrel Creek	N : 5
Stellaria Creek	C : 3
Straight Creek	E : 5
Sulphur Creek	G : 9
Surface Creek	G : 9
Surprise Creek	P : 9
Tangled Creek	J : 4
Thistle Creek	J : 10

Name.	*Map Reference.*
Thoroughfare Creek	R : 13
Timothy Creek	G : 13
Tower Creek	D : 10
Trail Creek	O : 12
Trappers' Creek	P : 13
Trout Creek	I : 9
Violet Creek	I : 8
Weasel Creek	K : 9
Willow Creek	H : 14
Winter Creek	E : 6
Witch Creek	O : 8
Wolverine Creek	R : 8
Yellowstone River (5,360)	A : 5

WATERFALLS.

[Figures in parentheses indicate approximate heights of falls in feet. These in most cases are not to be relied upon as strictly accurate, there having been no published record of actual measurements, except in the case of the Yellowstone Falls.]

Amethyst Falls	E : 12
Colonnade Falls	P : 3
Crecelius Cascade	L : 13
Crystal Falls (129)	G : 8
Fairy Fall (250)	K : 4
Firehole Falls (60)	I : 4
Gibbon Falls (80)	I : 5
Iris Falls	P : 3
Kepler Cascade (80)	L : 5
Lewis Falls, Upper (80)	P : 7
Lewis Falls, Lower (50)	Q : 7
Moose Falls	R : 6
Mystic Falls	L : 4
Osprey Falls (150)	D : 6
Ouzel Falls	P : 3
Rainbow Falls (140)	R : 4
Rustic Falls (70)	D : 6
Silver Cord Cascade	G : 9
Terraced Falls	R : 4
Tower Falls (132)	D : 10
Undine Falls (60)	D : 7
Union Falls	Q : 4
Virginia Cascade (60)	H : 7
Wraith Falls (100)	D : 7
Yellowstone Falls	H : 9
Upper, (112).	
Lower, (310).	

LIST OF THE PROMINENT GEYSERS.

The numbers in the third column are the highest recorded eruptions. The numbers in the fourth and fifth columns are not to be taken as indicating the correct duration or periodicity of eruptions. The prevalent notion that geysers exhibit uniform periodicity of action, is erroneous. There is only one geyser of importance in the Park that can be depended on, and that is Old Faithful. The figures for the other geysers are merely rough averages, true, perhaps, as the mean of a year's observations, but not at all to be relied upon in predicting particular eruptions.

The following abbreviations are used: "M. H. S.," for Mammoth Hot Springs; "N. G. B.," "L. G. B.," "M. G. B.," "U. G. B.," "S. G. B.," and "H. G. B.," for the Norris, Lower, Middle, Upper, Shoshone, and Heart Lake, Geyser Basins respectively; "E. S. Y.," and "W. S. Y.," for the East and West Shores respectively of the Yellowstone Lake; "s." for second; "m." for minute; "h." for hour; and "d." for day.

Name.	Location.	Eruptions.			Authors of Names. Remarks.
		Height.	Duration.	Interval.	
Arsenic	N. G. B.				U. S. G. S.
Artemesia	U. G. B.	150 ft.	10 m.	2 d.	U. S. G. S.
Atomizer	U. G. B.	20 ft.	10 m.		Unknown.
Bead	L. G. B.				Has a "beautifully beaded tube."—Comstock.
Bee Hive	U. G. B.	220 ft.	8 m.	20 h.	Washburn Party.
Bijou	U. G. B.				U. S. G. S.
Bulger	U. G. B.	5 ft.			U. S. G. S.
Castle	U. G. B.	100 ft.	25 m.	24 h.	Washburn Party. "From a distance it strongly resembles an old feudal castle partially in ruins."—Doane.
Catfish	L. G. B.				U. S. G. S.
Chinaman	U. G. B.				U. S. G. S. Really a quiescent spring. Sometimes called a geyser from the circumstance that a Chinaman who had used it for a washtub caused an eruption by the soap put in the spring, thus initiating the practice of "soaping geysers."
Clepsydra	L. G. B.	50 ft.	10 s.	3 m.	"Like the ancient water-clock of that name, it marks the passage of time by the discharge of water."—Comstock (1873).
Comet	U. G. B.	60 ft.	1 m.		U. S. G. S.
Congress	N. G. B.				Came into existence in the winter of 1898. Like the memorable 53d Congress, for which it is named, its performance is sadly incommensurate with its promises.
Constant	N. G. B.	30 ft.	10 s.	1 m.	Norris.

Sylvan Lake, East Road.

Name.	Location.	Eruptions.			Authors of Names. Remarks.
		Height.	Duration.	Interval.	
Cubs	U. G. B.	.....	.....	.....	See "Lion."
Deluge	H. G. B.	15 ft.	.....	.....	U. S. G. S.
Echinus	N. G. B.	20 ft.	.....	.....	U. S. G. S.
Economic	U. G. B.	.....	.....	.....	No water lost in eruption; all falls back into crater.
Excelsior	M. G. B,	300 ft.	.....	1 to 4 h.	"A geyser so immeasurably excelling any other ancient or modern known to history, that I find but one name fitting, and herein christen it the Excelsior."—Norris. The Sheridan parties in 1881 and 1882 called it the Sheridan Geyser.
Fan	U. G. B.	60 ft.	10 m.	8 h.	Washburn Party.
Fearless	N. G. B.	.....	.....	.....	Norris.
Fissue	N. G. B.	100 ft.	20 m.	2 h.	U. S. G. S.
Fitful	L. G. B.	3 ft.	.....	.....	Comstock.
Fountain	L. G. B.	60 ft.	15 m.	4 h.	U. S. G. S.
Giant	U. G. B.	200 ft.	90 m.	6 d.	Washburn Party.
Giantess	U. G. B.	250 ft.	12 h.	14 d.	Washburn Party.
Grand	U. G. B.	200 ft.	20 m.	20 h.	U. S. G. S.
Gray Bulger	L. G. B.	1 ft.	30 s.	1 m.	U. S. G. S.
Great Fountain	L. G. B.	100 ft.	.....	.....	U. S. G. S. Called Architectural Fountain in 1871.
Grotto	U. G. B.	40 ft.	30 m.	4 h.	Washburn Party.
Jet	L. G. B.	15 ft.	.....	.....	U. S. G. S.
Jewell	U. G. B.	50 ft.	1 m.	50 m.	U. S. G. S.
Lion	U. G. B.	60 ft.	8 m.	24 h.	With Lioness and Cubs called "The Chimneys" by Barlow in 1871; renamed "Trinity" Geyser by Comstock in 1878; most isolated cone called "Niobe" by U. S. G. S. in 1878; present name given by Norris in 1881.
Lioness	U. G. B.	80 ft.	10 m.	24 h.	See "Lion."
Lone Star	M : 5	60 ft.	10 m.	40 m.	Unknown. First called "The Solitary" by the U. S. G. S. in 1872.
Minute	N. G. B.	40 ft.	20 s.	90 s.	Norris.
Model	U. G. B.	.....	.....	.....	Geyser on a small scale.
Monarch	N. G. B.	125 ft.	20 m.	12 h.	Norris.
Mortar	U. G. B.	60 ft.	6 m.	8 h.	"Resembles in its eruption the particular piece of ordnance from which it derives its name."—Haynes Guide Book.
Mud Geyser	N. G. B.	10 ft.	5 m.	20 m.	Norris.
Mud Geyser	I : 9	80 ft.	20 m.	3 h.	Washburn Party.

Name.	Location.	Eruptions.			Authors of Names. Remarks.
		Height.	Duration.	Interval.	
Oblong	U. G. B.	40 ft.	4 m.	8 h.	U. S. G. S.
Old Faithful	U. G. B.	150 ft.	4½ m.	65 m.	Washburn Party.
Pearl	N. G. B.	.....	.....	.....	U. S. G. S.
Pebble	N. B. B.	50 ft.	.....	75 m.	U. S. G. S.
Pink Cone	L. G. B.	.....	.....	.....	U. S. G. S.
Restless	U. G. B.	.....	.....	.....	U. S. G. S.
Riverside	U. G. B.	80 ft.	15 m.	8 h.	U. S. G. S.
Rosette	L. G. B.	30 ft.	.....	.....	U. S. G. S.
Rustic	H. G. B.	47 ft.	4 m.	15 m.	U. S. G. S.
Sawmill	U. G. B.	35 ft.	.....	.....	U. S. G. S.
Sentinel	U. G. B.	20 ft.	.....	.....	Barlow.
Shield	S. G. B.	.....	.....	.....	U. S. G. S.
Spasmodic	U. G. B.	5 ft.	.....	.....	U. S. G. S.
Spike	H. G. B.	.....	.....	.....	U. S. G. S.
Splendid	U. G. B.	200 ft.	10 m.	8 h.	Norris.
Sponge	U. G. B.	.....	.....	.....	From appearance of the crater.
Steady	L. G. B.	30 ft.	.....	.....	U. S. G. S.
Surprise	U. G. B	100 ft.	2	.....	
Turban	U. G. B.	20 ft.	25 m.	.....	U. S. G. S. "From the fancied appearance of some of the large globular masses in its basin to a Turkish head-dress."—Peale.
Union (1)	S. G. B	114 ft.	60 m.	5 h.	U. S. G. S. in 1872. So named "because of its combination of the various forms of geyseric action."—Peale. No. 1 is North Cone; No. 2 Middle Cone; No. 3 South Cone.
(2)	.....	66 ft.	.....	.....	
(3)	.....	3 ft.	.....	.....	
Vixon	N. G. B.	.....	.....	.....	Norris.
White Dome	L. G. B.	12 ft.	.....	.....	U. S. G. S.
Young Faithful	U. G. B.	20 ft.	.....	.....	Earl of Dunraven.
Young Hopeful	L. G. B.	20 ft.	.....	.....	U. S. G. S.

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